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SCHOOL GARDENING
FOR LITTLE CHILDREN

LUCY R. LATTER

INTRODUCTION BY PROFESSOR GEDDES

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SCHOOL GARDENING FOR
LITTLE CHILDREN



SCHOOL GARDENING FOR LITTLE CHILDREN

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WITH AN INTRODUCTION BY
PROFESSOR PATRICK GEDDES
UNIVERSITY COLLEGE, DUNDEE, ST ANDREW'S UNIVERSITY



"Like a mirror one giveth back to the other"

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To

THE LITTLE CHILDREN WHO SHOW THE WAY

JUL 1 1906



INTRODUCTION

I

FOR the generation to whom we owe the bulk of our existing schools in town and country, the business of everyday life, more than ever in history before, was carried on by means of writing, and its results measured in terms of arithmetic; while among its recreations general reading held a foremost place, relieved for some by more or less vigorous muscular exercise. Hence their schools were avowedly conceived and constructed as, primarily, the temples of the "three R's"; hence, too, each was surrounded by its patch of exercise-yard, not only duly gravelled or asphalted for its inmates, but, for the better protection of the lieges, well fenced about with wood, high walled with brick, or, best of all, impenetrably caged in iron.

These constructions completed, or at least their architectural type and instructive purposes clearly established, the central authority was henceforth able to devote its main energies to codify, to examine, and inspect, the local authority to administer and tax, and the teacher to record attendance, to carry out instructions generally, and to receive payment, according to "results determined by varying official methods."

For a time, therefore, all progressed smoothly, until the administrator could congratulate himself upon having "encouraged" every study among his teachers—save, perhaps, that of childhood itself; and the Board or the inspector upon having considered everything, at least everything "practical," everything literary, even scientific—of course, outside mere sentimental interests, mere evolutionary dreams—say of "lilies, how they grow."

But the unrest of the times cannot be permanently kept from entering the school and training college precincts, any more than outside colleges of a larger growth; hence an increasing rise of criticism of a markedly unsettling character, and this not only among the public, or even between their three castes of educationists themselves—the central, the local, and their executive—but actually within each of these. Yet more important was the infiltration of new ideas and ideals, new educational theories, and even practices, from foreign sources, primarily Swiss and German (and of late also French and American). These all turned, not only upon sciences hitherto unrecognised, psychology and biology, but those of the child, which was considered no longer as the administrated unit or the information receptacle, but as the definite, not metaphorical, analogue of a growing flower. Its school, therefore, must become the no less definite analogue of the flower-garden—a "Kindergarten," in fact.

Not without long resistance, and many vicissitudes, the kindergarten has maintained its right of existence, though as yet under strict limitations,

imposed by the profoundly incompatible organisations so long in undisputed power. Now, however, a new step is beginning, nay—in America especially—has been all but fully made. As in Rome of old, upon the long enslaved pedagogue and his autocratic master alike has been coming a new spirit, has been dawning a new interpretation of the meaning and possibilities of life, and these of the child's life even more than of their own.

With this change of ideals and ideas has begun an amelioration of scholastic codes, a relaxation of official rituals—indeed, a transformation of pedagogic methods in principle and detail—and naturally, wherever applied, with immediate and well-marked improvements in health and happiness, in intelligence and in character therefore also.

The teacher's office thus vitalised and magnified, the parents, and the laity generally, thus aroused to a fresh interest and hope, one new development follows another, and the bettering of schools for a bettered generation has fairly begun.

II

With this renewed culture of child-life the literal culture of flowers has fitly been keeping pace. First, an indoor flower-shelf has frequently been granted, despite administrative fears—as that watering might wet the floors, and water-carrying render the playground untidy. Next, window-

boxes, at first a rare and dubious innovation, are being granted wherever applied for—nay, there are new playgrounds where even trees have been planted, spots where flower-bed or rock-work has been laid down.

But while we have been making these small and timid changes upon our schools, far more thorough advances have been in progress upon the Continent and in America. In France especially it has been realised that however natural for lawyer or priest, central bureaucrat or local shopkeeper, to shape all education upon their own clerkly image, this could not suffice the bulk of a nation—artisans, peasants, artists. Hence, while we have probably not yet 100 school gardens in the three kingdoms, France had five years ago thus provided some 28,000 of her 33,000 schools; and even Russia, of which we so commonly underestimate the educational progressiveness, had a few years ago some 8000—as many as in the United States.

The complacency, even pride, then, with which we and our educational authorities have been wont to view our schools thus still needs qualifications; but the question of how gardens are now actually to be made in our crowded and smoky cities may not unnaturally at first perplex the most sanguine educationist or city improver of us all.

Imagine, then, that by some gentle solvent—of which so few of us, alas! have the secret, yet which our present author is here to communicate—we could see one local authority and its stony asphalt melting and giving way together, and each opening

to receive the good seed of the literal and concrete child-garden, no longer merely of the metaphorical one. Yet this is the marvel which our writer has accomplished; and this the initiative which the local managers, the late London Board, have effected for and through her little ones—an example for which we owe them not only ordinary praise and thanks, but these in their highest form—of frank and speedy imitation in our turn. For here is that first step which counts for so much, yet after all has cost so little, so that before going further the reader is asked to recall the ordinary aspect of the nearest school playground, and thence to turn to the photograph on page 72, to glance also at some of its companions. He will thus realise, though probably not without some little difficulty, that the one was but lately as the other; and thus candidly admit, despite whatever little reluctance, that, just as we may nowadays have an indoor kindergarten anywhere, so, with but a little preliminary loosening of our artificial crust, mistress and children can soon make a real garden around it for themselves.

III

But what, it may be asked, of the educational value of all this? As botanist and gardener, I have been making here and there a school-garden these five and twenty years, as rare opportunity offered; but to most teachers or Boards, such as

I must generally seem mere specialists pushing their particular "fad," even if we are not identified with the too frequent desiccation of our science. But here we have a headmistress, trained in all the wisdom of the Froebelians, and one who is still paper-folding and basket-weaving with the best, and busying her little folk with games and songs at their brightest; and when she finds experimentally that it is in and through her little school-garden that she can best work, best apply the discoveries of the educational masters, her evidence is naturally of more worth and weight than can be all the arguments of the biologists.

There is, indeed, a yet deeper justification for the simple educational methods suggested here; a fuller educational advantage of the kindergarten mistress with her little workers over the specialist in his laboratory or botanic garden. In the dark places of the earth we still wrangle as if "Greek" and "Science" were antithetic, and in the boys' schools which lead up to or come down from them, we still think of a "modern side" as characterised by science. But meanwhile a new step in educational theory and practice is being made in progressive quarters, and is now rapidly being extended, especially among American and British schoolmistresses, thanks not only to their greater sensitiveness to fresh ideas, but to their greater freedom from the authority of dead ones. How, then, shall we define this principle briefly?

Individual education, for which in periods of fixity bookish instruction and routine apprentice-

ship sufficed, and which since the discredit and decline of these has been half helped, half paralysed by "modern" or "technical" instruction in the main merely scientific, and generally of pre-evolutionary type at that, has long instinctively claimed (witness "Robinson Crusoe"), and now begins to receive as its due, an *abbreviated recapitulation of the evolutionary process*, an abridgment of the actual rise of civilisation—e.g. from primitive tool-making to craftsmanship, from fire-making to electricity, from shelter-making to architecture and decoration, from spinning, weaving, and garment-making to embroidery, and so on; perhaps, above all, from primitive food-getting to horticulture and agriculture. Of course, with all these goes a real participation in the civilisation and the culture which these stages of progress have produced, and still imply. Instead of the curse of toil, the drudgery of business, the gambling and the squandering of gain (and our colleges and schools, which at best shrink from all this, at worst prepare for it), and instead of economic and educational theories, boastedly "practical" (but really only of theory, and the theory for the most part but mammon-myth at that), a better and concretely practical school is arising in our midst, here in kindergartens and there in laboratories. This sees life, and prepares for it, primarily as worthy activity; and thus, in a word, rescues education and industry alike from the sway of a false economics, which was little but Mammonology at bottom, and reunites them, in terms of civilisation at once old and new, as Technodrama.

The child at play in make-believe and game, at work in garden, is thus a true technodramatist, from whom would-be educators, be they scientific or technical, have much to learn before they can adequately teach.

But life and education are more than industry, and even art? Assuredly; but so also is a child's garden. Here in this modest little volume are also indications enough of how each teacher, in her own way—not necessarily yours nor mine—may express to her charges her poetic associations, her aspirations, and ideals.

Here, then, from the kindergartens, so long repressed and despised, and still by many so grudgingly tolerated, there are arising examples and influences towards the needed transformation, alike of the material environment and of the inward functioning of our schools, at all levels. Nay, pointing and leading directly towards the needed transformation of our whole modern city development; for it will be for this coming generation of child-gardeners themselves to make the Garden City.

As amid our politics, religious controversies, and education enactments the realities of education again disclose themselves, we again see now and then a little child in the midst; and the hope is not perhaps wholly Utopian, that even those respectively inheriting the watchwords of "science" and "religion" may be able to unite in such an exegesis as that a certain passage of the child's reading not only says "consider"—"the lilies"—"how they"—"grow,"—but means that.

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Meantime, however, may we not allow our own schoolmistress and her children to proceed to the reclamation of the administrative desert of our particular school-yard? Each oasis, once begun, may grow; some day they may even meet.

PATRICK GEDDES.



AUTHOR'S PREFACE

THIS book does not profess to be a formal treatise on the making of school gardens; its aim is to show the place of Nature-teaching in kindergartens and schools, and the method by which the subject should be approached with young children. The book comprises a series of articles written for *The Practical Teacher* in the hope that the experience set forth therein might encourage other teachers to introduce Nature-teaching in their schools. In response to many requests, from teachers and others, these articles are now issued in book form, with alterations, additions, and some new illustrations, by the courtesy of the publishers of *The Practical Teacher*.

I would also here acknowledge my indebtedness to the editors of *One and all Gardening* and *The London Magazine* for permission to use the various illustrations of my children at work in the school garden.

I owe much to Professor Geddes, and am grateful for the insight which has come to me

from his books and his lectures on education, in its broadest and deepest sense, as well as for his criticisms on my work.

As a follower of Pestalozzi and Froebel, and stimulated anew by Professor Geddes, I have tried, with the aid of a sympathetic staff, to prove that it is possible to make Nature-teaching the central point of the life of a school without detriment to the children ; that such teaching gives a real meaning and incentive to all the handwork, and leads to a richer and truer appreciation of poetry, pictures, and music. The experiment has been going on for nearly six years, during which time it has successfully stood the test of Government Inspection. Each year has shown an increasing gain to the children intellectually as well as physically and morally. Instead of the children being less prepared for the work of the senior schools, it is found that they read, write, and do arithmetic as well, if not much better, for having had daily contact with plants and animals, and opportunities for observing the various natural phenomena which affect their lives in one way or another. It is further found that such children pass on to the senior schools with a quickened power of observation, a far greater amount of intelligence, a keener desire to learn, and a greater

refinement of heart, than if their earlier years had been spent in acquiring mechanical perfection in the arts of reading, writing, and arithmetic before any real experience had been accumulated as a basis for those more formal branches of instruction.

Teachers who have had longer experience in actual school work need surely have no anxiety, therefore, in giving full play to Nature-teaching in their schools. The way should be easier, and the results richer and greater. The suggestions from the Board of Education offer facilities hitherto unknown to elementary teachers. Let us not rest, therefore, until every kindergarten and school becomes, in deed as well as in name, a place where our children may have opportunities for enjoying as fully as possible communion with some of the beautiful things of Nature, and where we, as educators and teachers, may come to find a new and deeper interest in life, since in wandering forth with our children into the realms of Nature we may be helping to hasten a new order of things which shall conduce to the welfare of humanity as a whole.

LUCY R. LATTER.

LONDON, *February* 1906.

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SCHOOL GARDENING FOR LITTLE CHILDREN

CHAPTER I

“ Earth’s crammed with heaven,
And every common bush afire with God ;
But only he who sees takes off his shoes.”

A GREAT wave seems to be passing over our educational methods to-day ; and people are beginning at last to realise that it is “ Neither book, nor any product of human skill, but life itself, which yields the basis for all education and instruction,” and that the proper atmosphere for little children, at least, to be brought up in is that in which they can come in daily loving contact with some of the wonderful things of nature, of which they are then so part and parcel. If at any period of life, it is certainly during the first years that immediate contact with living things is of the utmost importance ; for, as Froebel says : “ An instinctive yearning drives a child to busy himself with natural objects. This instinct does not rest satisfied with apprehension of the facts of nature,

nor of the secondary principles which govern these ; its root lies far deeper. Stripped of all disguises, it is the eternal search made by man after the first, great, personal cause—the Godhead.”

Furthermore : “ It is,” says the same writer, “ of the utmost importance that children should acquire the habit of cultivating a plot of ground of their own, long before the period of school life begins, for this reason : nowhere as in the vegetable world can his action be so clearly traced by him, entering in as a link in the chain of cause and effect. The effects are no less due to the intervention of his will than to the sequence of nature.”

Communion with nature, then, must have the *first* place in infant (secular) education, and so form the central point of all the other work of the school ; for, as the children gather up ever new experiences in their work of tending the plants or animals committed to their care, they will want to express those experiences in some concrete form, be it with paper and chinks, building blocks, or any other material—nay, later, they will even want to find out what grown-up people have thought and written about the things which have been engaging their attention and care, and filling their hearts with love and wonder.

Communion with nature is not to be regarded merely as a means of acquiring so much technical knowledge about this or that plant or animal, or this or that natural phenomenon. It is to be primarily the means for awakening and fostering in the children a love of the things of nature. Love in its truest sense means *doing* something for the object cherished ; and, whilst the children are therefore *busy with the things of nature*, they are quietly acquiring a whole host of experiences, which later on become the basis for formal instruction. These experiences are so delightful to the children that they are intensely eager to follow them up and discover new facts for themselves. Every day groups of my own children may be seen gathered in front of the various garden beds before and after, and in every available moment during school hours, endeavouring to find out what has happened there since the morning, or the previous day, perhaps. The joy with which these children come afterwards to tell whether the snowdrops are nearly ready to ring their dainty bells ; whether the winter aconite has appeared with its pretty green frill and lovely golden cup ; what plants are still only half awake ; and countless other things, amply proves that no better foundation for science and religion can be laid than that loving,

reverent interest in nature which has found out by seeking, that in this universe of ours,

“ All's love, yet all's law.”

Such work needs a most careful and skilful organiser ; who is a lover of Nature in all her forms and varying moods, and who believes that every flower that blows, every creature that creeps, soars, or moves, and every cloud that floats across the vault of heaven, has a divine message for everyone who wills to read it. Hence the work should be approached in deep humility and loving reverence, for only so can the Divine life within all things be revealed to us. Since God Himself planted the first garden, a sacred seal has been set upon the work of gardening ; and, indeed, “ it is the purest of human pleasures. It is the greatest refreshment to the spirits of man, without which buildings and palaces are but gross handiworks.”

From these few introductory remarks I will now pass on to detail my own experience in school gardening with little children. I will first of all relate very briefly my experience at Deptford, in order to indicate what may sometimes be done where it is not possible to have a garden in the school playground, or even on the school roof. Then I will relate my experience in my present

field of work, where a piece of ground has been dug up in the playground, and given over to me for gardening purposes with my children.

At the end of August 1899 I began my new lifework by taking up my duties as headmistress of the infants' department of the Creek Road Board School, Deptford—a neighbourhood perhaps as poor as any to be found in London. It certainly did not seem a place where plants could thrive; but I soon found that, with loving care and thought, a great deal could be done there in the way of nature work, and ere long there was a nice little array of miniature forest trees (baby oaks and chestnuts, etc., growing in water as well as in earth) and pretty flowers in the various classrooms; for all my assistants were only too eager to co-operate with me as far as they could. Animal pets we also had, although the keeping of them in a school is attended with many difficulties.

There were no facilities for outdoor gardening, but one day, whilst exploring the neighbourhood between the morning and afternoon sessions, I chanced to stray into the old St Nicholas Churchyard, one of the antique features of old riverside London, its ancient square tower being a landmark from time immemorial for ships and boats on the Thames, and its grim gateway, sur-

mounted with skull and cross-bones, a picturesque survival of the past. It happened to be a hot day, so I sought shelter from the midday sun under an old plane-tree. Whilst resting there, visions came to me of a garden in that old churchyard, tended by the older children of my school ; or groups of my tiny babies playing about among the long grass on a free spot right in front of me ; and of countless other joys. These visions were soon to be realised. On the 11th of September the first group of children went with me to the churchyard. There, under the shade of the old plane, we listened to the birds (mostly sparrows), and watched the soft, white, fleecy clouds sail across the blue sky of Deptford. The fruit of the plane-tree arrested the children's eager attention. Was it not " Nature's own little ball on a string " ?

From this time forward the St Nicholas Churchyard became the chief place for our outdoor nature observation. Fallen leaves were gathered up and taken over to the school, which is about three minutes' walk from the churchyard. There they were examined, and then used to make the rooms look pretty. Of special interest were the leaves of the plane-tree, with their wonderful provisions for the protection of the buds of the next year's leaves. The leaves of the poplar also afforded us

great pleasure with their graceful, trembling movement.

When the spring came I decided to go a step further; and one morning I accordingly went to the curate then in charge of the church, the Rev



SPRING-TIME IN OUR GARDEN

“Once more the heavenly Power makes all things new.”

Alfred T. Wallis, and asked whether I might have a little piece of the churchyard for gardening purposes with my children. My request was most heartily acceded to; and from thenceforth my visions gradually became realities. I soon had

a piece of ground, about 54 feet long and 4 feet broad, under actual cultivation, and the work of the school connected therewith.¹

On the 12th of November 1900 I was transferred to my present beautiful school, the "Invicta," Westcombe Park (Greenwich Division). There was not an inside sill to any of the windows in the classrooms or hall on which even small flower-pots could be placed. Soon after the school was opened, however, the late Board agreed to put shelves to the windows in question, and also to give me a strip of ground in the playground, near my own department, for outdoor gardening work with the children. In the following summer a portion of our playground, 80 feet long and 8 feet broad, was accordingly dug up, and earth laid down where hard asphalt had hitherto existed. A little border of fancy tiles was put round three sides of this strip of ground, which is situated alongside of the fence to the right of the entrance gate, and has a somewhat south-westerly aspect. Practically it gets the weather from all sides, however, for the fence does not offer much protection from north-east winds.

Towards the end of July (1901) we took posses-

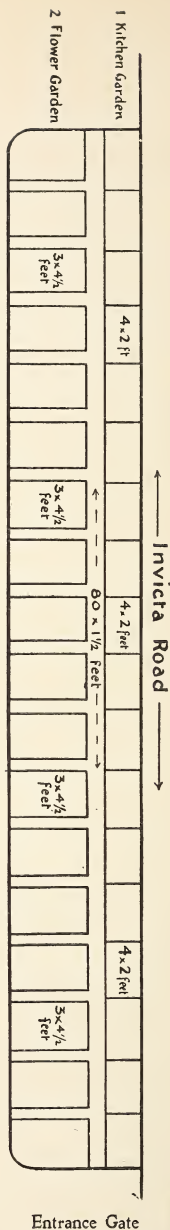
¹ A full account of this experiment was published in a German magazine in 1903.

sion of this strip of ground ; but we did not do much with it till after the summer holidays, which were then close at hand. The strip was first of all marked off lengthwise into two portions—(1) a strip against the fence, two feet deep, for a *kitchen garden*, divided by a path $1\frac{1}{2}$ feet in width from (2) a strip, $4\frac{1}{2}$ feet deep, for a *flower garden*. The strip against the fence was then subdivided into eighteen little beds, each 4 feet broad and 2 feet deep, whilst the front strip was subdivided into eighteen beds, each 3 feet broad and $4\frac{1}{2}$ feet deep, separated by paths $1\frac{1}{2}$ feet in width. (Plan, p. 10.)

The borders and pathways were made respectively of large and small stones, gathered by the children for the purpose, and by permission, from a place near the school where building operations were going on. When all this preliminary work was done—the children always helping in every operation—the beds were allotted, a girl and a boy getting a bed between them for a year, so that they might observe the sequence in nature and the results of their own labours.

Then the actual gardening began. Potatoes were set in three back beds, and bulbs of many kinds in six front ones, the remaining beds being left for stock plants, and spring sowings. In one of the bulb beds were planted three bulbs of the

PLAN OF THE GARDEN.



Water tap added some time
after the garden was made

Position of our School
with regard to the Garden

ONE ENTRANCE
↑
⋮



white lily (*Lilium candidum*), some blue squills, and some yellow narcissi, to typify in living form the flower (the white lily) and the colours (white, blue, and gold) of our school, as set forth on our flag. This bed therefore became the special pride of the children.

Then came a period of waiting and watching for the appearance of the plants, the bulbs of which had been so tenderly hidden in the ground by the children themselves. The ever-increasing eagerness with which the earth was watched when it began to crack, and give signs of something going on beneath, could never be described in words, and much less the joy which the gradual appearance of the tender little shoots awakened in the children's hearts. Soon a delicate little snowdrop rose up from the dark earth and shook its dainty bell, as if to summon all the other flowers from their winter sleep.

CHAPTER II

“ And the spring arose on the garden fair,
Like the spirit of love felt everywhere ;
And each flower and herb on earth's dark breast
Rose from the dreams of its wintry rest.”

WHILE the spring flowers were gradually making a brave show in the bulb beds, other things had been set in the remaining beds of the garden.

Red and blue flax, larkspur, clarkia, eschscholtzia, stocks, sunflowers, and mignonette were among the seeds sown in the flower garden ; and radishes, lettuces, onions, carrots, and runner beans in the kitchen garden—with the result that we had a glorious show of sweet and beautiful flowers, and goodly, if but small, crops of vegetables, the ensuing summer (1902).

The bulb beds had meanwhile to be attended to. As the crocuses, for instance, finished their work above ground their leaves were plaited, and the ends neatly stuck down in the soil. Whilst the crocus beds were thus being tidied up, the seed or treasure boxes of some of the crocuses were found and taken care of. And so with the other bulbous

plants. They in turn received special attention, and every new seed box was hailed with delight by the children. The seed box of the iris should be specially looked for by those who have any such plants in their garden—it is so very beautiful. Some hardy annuals taken from overcrowded beds were planted among the bulbs from time to time. In this way the bulb beds looked tidy and pretty all the summer months. Meanwhile the children had ample opportunity of watching the bee and butterfly visitors to their garden. The earth worm, too, was a source of great interest: one was found in the little channel it had so carefully made as a means of exit to the upper surface of the earth. The dew on the Indian cress (*Tropæolum*) leaves one morning stirred the children's imagination. The perfect little drops glistening on the green shields, held up as if to protect the flower beneath from the sun's rays, suggested the touch of a magic wand. Another day the children noticed that the plants were all bending in one direction. Æolus had passed unseen through the garden, and touched the frail plants with his breath "in greeting wild."

Harvest time for the summer plants was approaching, and soon came the ingathering of the various treasure boxes of the plants which

needed only a relatively short time to prepare their seeds—such as the flax, clarkia, radish, etc. This afforded plenty of work in the classrooms as well as out of doors, for the seeds had to be separated from their “cases,” dried, carefully packed, and stored away for use the following year. And so the children saw again the wonderful and countless ways in which the various plants take care of and provide for their little seeds; and dim perceptions of their own parents’ care for them were thereby awakened in them.

As to the destiny of the produce of our garden, one of our greatest objects is to help the children to experience the joy of real giving—the high privilege of true work, and the means which it affords of giving pleasure to others. When, therefore, the harvest time comes we like to share the produce of our garden with others—perhaps with some little children who have no garden of their own. Sometimes a comrade is ill, and a few flowers go to cheer him; whilst parents and teachers are not forgotten by the little ones in the distribution of their gifts. On one occasion, during some very cold weather, we were able to invite fourteen of our children, who happened to be very poor, to a “feast” of boiled potatoes and butter. The potatoes had been grown in our own

garden. All the preparations for the "feast"—the washing and boiling of the potatoes, the setting of the tables, etc., were made by small groups of children, who afterwards saw also to the clearing and washing up of the plates and spoons, etc.

Each class holds a certain number of beds in the garden each year, according to the size of the class, so that children from every part of the school have a share in the outdoor garden work.

The actual owners of the beds for the time being may invite some of their comrades to help at any busy season—for instance, when the garden has to be cleared of the weeds which have grown apace during a holiday, or when the seeds are ready for ingathering. But whilst direct provision can only be made at present for seventy-two little outdoor gardeners each year, opportunities are provided for indoor gardening in pots and boxes for the children who cannot yet have a bed in the garden from the smallness of its size in proportion to the number of children attending the school; and, whenever possible, similar plants are grown indoors and out of doors.

Here I would like to say that experience amply proves that outdoor gardening with little children should only be taken as group work—that is to say, with but a small number of children at a time.

Except for such work as watering the beds, or removing any stones from the same, when more children may easily be employed, from eight to ten children are about as many as one teacher alone can keep really occupied at a time, for she has to superintend and direct so many different operations the while. One bed may require weeding, another may have to be raked over, whilst in the kitchen garden there may be some runner-beans to string up, or some carrots to thin out, and numberless other things. This leads to another point—namely, the advisability, particularly under the present conditions of school life, of beginning on a small scale. Whilst it is most desirable to secure as much ground as possible for gardening purposes, it will be well at first to lay out only a portion of it in little beds for the cultivation of flowers and vegetables, etc., and to sow the remainder with grass seeds. Grass has many wonderful secrets to reveal to the loving heart, the seeing eye, and the listening ear, for there is not

“ A blade too mean
To be some happy creature’s palace.”

As the possibilities for gardening become greater, more ground may be taken in for the garden from the little field of grass. Pending its being required for more special cultivation, a few bulbs may be

set in the little field. Bulbous plants always look pretty among grass.

Gardening of any kind means much loving labour and time, but the expenditure of both is



9.40 TO 10 A.M. IN THE "INVICTA" INFANTS' SCHOOL

" Spring, Spring, beautiful Spring,
Laden with glory and light you come ;
With the leaf, the bloom, and the butterfly's wing,
Making our earth a fairy home."

more than justified by the value of such work to the children—physically, morally, and intellectually. In my school twenty minutes every morning (9.40 to 10 A.M.) is devoted in every class to the care

of natural objects by the children—that is to say, to the setting, tending, and watering of plants in and out of doors ; the cleaning of the flower-pots and saucers ; the preparing of flower-boxes for the classrooms and hall ; the feeding and tending of animal pets, the cleaning of the homes of the same, etc. An additional twenty minutes is allowed on Mondays—at the end of the afternoon session in the case of the three upper classes, and in the morning in the case of the three lower ones—for the special cleaning of the shelves, etc. To gardening, in and out of doors with groups of children, *at least* forty-five minutes a week are given, according to weather and needs. Twice a week thirty minutes are devoted in the morning to the consideration of special natural objects or phenomena (the object lessons of the Government Code).

Believing it well to let the children pause a little in the midst of the hurry and rush of our modern life, we select one natural object on which specially to concentrate our thoughts and work for a few weeks. This does not prevent the general observation of the many things which come under our notice, but rather helps to show that “ nothing stands alone ” ; for there is then time to consider the subject from all sides—that is to say, in its

relation to other plants, animals, and natural phenomena, and also as it affects the daily life of the children. It also often happens that we have to return again to a subject. For instance, the radish was under special consideration during the month of June one year, but it was only in the August and September following that the flowering and fruiting of some radish plants could be brought under the notice of the children.

The subjects are fixed upon and studied long before they actually become objects of special attention in the school. For instance, last April the children sowed carrot seeds in some of their vegetable plots. In the autumn the children pulled up and utilised the produce (of this stage) of some of their seeds. The subject was not specially considered then. Some of the carrots were left in the ground to continue and complete their work (this year). When this has been done, and when carrots in the earlier stage (grown from seeds which will be sown this spring) appear, the carrot will become a subject for special consideration, the children having witnessed and taken part in the whole life-history of the carrot by that time. All the while we try to lead our children to realise that every fresh discovery in the realm of Nature is but a step to something *more*.

The subjects for special consideration are chosen from the list of things growing in the garden ; but they also include natural phenomena, and animal visitors affecting the garden for good or ill : thus the earthworm, the garden snail, wind, rain, snow, etc., have all received special attention at the right time.

Our school-garden work is supplemented by walks from time to time with our children to Greenwich Park and Blackheath. In this way the children get a more extended glimpse of the realm of Nature.

The things sown or planted in our garden are of the very simplest kind, such as might be found in a working-man's garden ; but the choice of even these is limited.

We found when working in our garden that the stones of which we had made the paths were apt to be kicked out of place by the feet of the little workers ; so in the autumn of 1902 I asked the late Board that a little of the best Croydon gravel might be put down over the paths to bind together the loose stones which we had placed there. This was done, and at the same time a cartload of stable manure was brought and put down on the beds. Later, when matured, this was dug in by the children. This manure proved a source of

trouble. Early in the following spring, when digging the ground and otherwise preparing it for the spring sowings, we found almost every bed beset with an unpleasant-looking grub. We tried



9.40 TO 10 A.M. IN THE "INVICTA" INFANTS' SCHOOL

. . . "So from the root
Springs lighter the green stalk, from thence the leaves
More airy, last the bright consummate flower
Spirits odorous breathes."

to get rid of the pest by watering the beds with soapy water, with water to which a little paraffin had been added, and also by mixing a little dry lime with the soil—but all to no purpose. We

hesitated over our spring sowings ; but at last we determined to risk them, as the grub in question had more the appearance of a stable production than of anything else. By-and-by the soil was completely riddled with little holes, out of which swarms of what seemed to be manure flies (*Scatophaga stercoraria* and *S. scybalaria*) made their exit. Some had red, whilst others had black, bodies. The children called them "soldiers," "bloodsuckers," "stingers." They disappeared, at last, from the garden—probably to visit some stables not far off—apparently without having done much harm to our plants, and, as we afterwards found, without having left any traces from which the garden might later have suffered.

CHAPTER III

“There ought to be gardens for all the months in the year ; in which, severally, things of beauty may be then in season.”

It will perhaps be well now to say a few words as to how the costs of all the gardening described in the two previous chapters are defrayed.

Under Article 255 of the Code of the late School Board for London,¹ I am allowed the sum of ten shillings per annum for the purchase of seeds, etc., for the cultivation of plants in school, and a similar amount for expenses in connection with our outdoor gardening. These amounts are by no means sufficient to cover all the costs incurred thereby, although we save and use seeds and bulbs from our own plants from year to year, and from time to time get gifts of other seeds and plants from some of our children, their parents, and other friends.

Under the Article already referred to, an additional sum of four shillings a quarter is allowed for the purchase of material for use in object lessons.

¹ The Code of the London County Council is the same at present as that of the late School Board for London.

This is a further help in the matter of maintaining our indoor and outdoor gardening. Suitable gardening tools for the children's use are also provided. The following is a list of them :—Watering-cans, trowels, rakes, spades, hoes, and hand forks. They may be applied for on the yearly requisition forms for school materials. The holland pinafores used in the modelling lessons will be found most useful for the little gardeners, and they may be obtained in the same way as the gardening tools.

Our garden is not in any way protected from intruders, and occasionally footprints, of various sizes, on the beds tell a sad tale. We think, in spite of this, however, that it is better to lead would-be mischievous people to respect our garden by leaving it free to them than by raising barriers against them. Our own children love the garden too well ever to do it the least harm. A new child may at first be tempted to pull a plant or pretty flower in a wanton manner, but he soon learns the law of the school, which consists in—

“ Controlling, not with tyrant's might,
But, helping all things move aright,
With gentle, guiding hand,”

and becomes as ardent a protector of the tender flowers and plants as his comrades.

Now it will be interesting to see what things were

sown or planted in our garden at different seasons of the year, and how they throve. Then a list of the subjects which were under special consideration during one year will show how our garden is the source from which we draw material for our special nature study (the object lessons of the Government Code), and, therefore, more or less for all the work of the school.

I twill be remembered (Chapter I.) that we were only able to begin our outdoor gardening after the summer holidays of 1901, and that we confined our planting that autumn to three beds in the kitchen garden and six in the flower garden ; potatoes being set in the former, and bulbs for the most part in the latter. The settings and sowings then and later were planned somewhat thus : tall plants in the centre of the bed, plants of medium height round them, and plants growing near the ground, and forming, therefore, a suitable border, round the whole edge of the bed. This arrangement is indicated in the following lists by the terms *centre*, *round centre*, *border*. The more special arrangement of the plants was left to the fancy of the little gardeners. The tall centre plants were sometimes arranged in the form of a ring, sometimes in that of a cross, whilst those of medium height around were arranged in semi-

circles, or scattered here and there between the plants of the centre and the border. The figures opposite the names of the bulbs in the following lists indicate the number of bulbs, etc., set in the particular bed. The beds are numbered from right to left of the spectator, and, therefore, as the plan in the first chapter shows, from the end of the garden near the entrance gate of our playground.

BULBS, ETC., PLANTED IN OUR FLOWER GARDEN,
NOVEMBER 1901

BED 2

Centre . . . Daffodils, 7.
Round Centre Hyacinths, 8.
Border . . . Mixed crocuses,
40.

BED 5

Centre . . . German iris.
Round Centre Winter aconite,
18.
Border . . . Purple crocuses,
50.

BED 8

Centre . . . Japanese anemones.
Round Centre Pheasant-eye narcissus, 8.
Border . . . Mixed crocuses,
50.

BED 11

Centre . . . Scarlet lilies, 4.
Round Centre White and red tulips, 12.
Border . . . Snowdrops, 50.

BED 14

Centre . . . German iris.
Round Centre Pheasant-eye narcissus, 8.
Border . . . Winter aconite,
50.

BED 17

Centre . . . White or Madonna lilies, 3.
Round Centre Yellow narcissus, 8.
Border . . . Blue squills, 50.

FOR LITTLE CHILDREN

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LIST OF SEEDS, ETC., SET IN OUR FLOWER GARDEN

MARCH 1902

BED 1

Centre . . . Lilies of the valley.
Round Centre Tall sunflowers.
Border . . . Blue flax.

BED 3

Centre . . . Poppies.
Round Centre Cornflowers.
Border . . . London pride.

BED 4

Centre . . . Lilies of the valley.
Round Centre Ten-week stocks.
Border . . . Mignonette.

BED 6

Centre . . . Sweet peas.
Round Centre Clarkia.
Border . . . Lupines.

BED 7

Centre . . . Eschscholtzia.
Round Centre Convolvulus minor.
Border . . . Forget-me-nots.

BED 9

Centre . . . Tall sunflowers.
Round Centre Phlox.
Border . . . Red flax.

BED 10

Centre . . . Convolvulus major.
Round Centre Larkspur.
Border . . . Ten-week stocks.

BED 12

Centre . . . Dwarf sunflowers.
Round Centre White peas.
Border . . . Forget-me-nots.

BED 13

Centre . . . Maize.
Round Centre Helichrysum.
Border . . . Blue flax.

BED 15

Centre . . . Poppies.
Round Centre Larkspur.
Border . . . Mignonette.

BED 16

Centre . . . Lilies of the valley.
Round Centre Tall sunflowers.
Border . . . Forget-me-nots.

BED 18

Centre . . . Sweet peas.
Round Centre Dwarf Indian cress (*Tropaeolum minus*).
Border . . . Primroses and polyanthus.

FOR LITTLE CHILDREN 29

annuals, so it may be well to give a list of the seeds, etc., set the following spring (1903). The rotation of crops was very carefully considered in making out this second list. We left all the bulbs in the ground, but added to their number and variety in the autumn (1902).

NEW BULBS ADDED, NOVEMBER 1902, TO THE BULBOUS BEDS ALREADY DESCRIBED

BED 2.—Hyacinths, 6. Daffodils, 6.	BED 11.—Snowdrops, 50. BED 14.—Gladioli, 6. Narcissi, 8.
BED 5.—Gladioli, 9.	BED 17.—Spanish iris, 50.
BED 11.—Tulips, 6.	

LIST OF SEEDS, ETC., SET IN OUR FLOWER GARDEN, MARCH AND APRIL, 1903

BED 1	BED 4
<i>Centre</i> . . . Lilies of the valley—perennial —of last year.	<i>Centre</i> . . . Tall sunflowers.
<i>Round Centre</i> Yellow lilies.	<i>Round Centre</i> Red flax, and (<i>Border</i>) . . . Ten-week stocks between.
<i>Border (or near it)</i> Foxglove, Canterbury bells, lemon thyme.	BED 6
	<i>Centre</i> . . . Poppies.
	<i>Round Centre</i> Mignonette.
	<i>Border</i> . . . Nemophila.
BED 3	BED 7
<i>Centre</i> . . . Sweet Sultan.	<i>Centre</i> . . . Sweet scabious.
<i>Round Centre</i> Godetia.	<i>Round Centre</i> Canterbury bells.
<i>Border</i> . . . Candy tuft.	<i>Border</i> . . . Phlox.

BED 9

Centre. . . Sweet peas.
Round Centre Coreopsis.
Border. . . Mignonette.

BED 10

Centre. . . Dwarf sunflowers.
Round Centre Lupines.
Border. . . Sweet alyssum &
 red flax between.

BED 12

Centre. . . *Clarkia.
Round Centre CONVULVUS
 minor.
Border. . . *Mignonette.

BED 13

Centre. . . *Eschscholtzia.
Round Centre *Eschscholtzia.
Border. . . *Blue flax.

BED 15

Centre. . . *Poppies.
Round Centre *Larkspur.
Border. . . Dwarf Indian
 cress (*Tropæ-
 olum minus*).

BED 16

Centre. . . Lilies of the val-
 ley—perennial
 —of last year.
Round Centre Clarkia.
Border. . . ¹ Blue flax.

BED 18

Centre. . . Eschscholtzia.
Round Centre Eschscholtzia.
Border. . . Primroses — per-
 ennial—of last
 year.

SEEDS, ETC., SET IN OUR KITCHEN GARDEN,

MARCH 1903

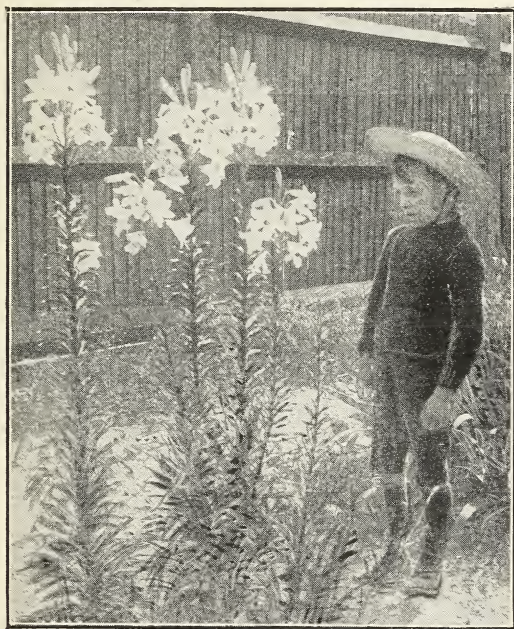
BED 1.—Cabbages.
 BED 2.—Potatoes.
 BED 3.—Scarlet runners.
 BED 4.—Radishes (round).
 BED 5.—Painted ladies (red
 and white runners).
 BED 6.—Broad beans.
 BED 7.—Carrots (short horn).
 BED 8.—Potatoes.
 BED 9.—Peas.
 BED 10.—Onions.

BED 11.—Long carrots.
 BED 12.—Cabbage lettuces.
 BED 13.—Scarlet runners.
 Radishes (long).
 BED 14.—Carrots (short horn).
 Sweet lavender.
 BED 15.—Cos lettuces.
 BED 16.—Carrots.
 BED 17.—Shallots.
 BED 18.—Scarlet runners.
 Radishes (round).

We had a fine show of bulbous flowers again in the spring. The weather was, however, not very

¹ Seeds saved from our plants of the previous year.

favourable to our garden during the succeeding summer and autumn; so the seeds, etc., set in the spring did not yield such rich flowers as those of the previous year. The sweet alyssum, never-



A CORNER OF THE SCHOOL GARDEN OF THE "INVICTA"
INFANTS, IN JUNE

"Consider the lilies how they grow."

theless, yielded a profusion of dainty little flowers, emitting a most delicate and sweet perfume, and the nemophila charmed us with its masses of lovely little blue eyes. The chrysanthemums made a

splendid show all the autumn through, and so did the Indian cress or *Tropæolum*.

As it is advisable to take up bulbs after one, two, or three years, as the case may be, we decided to plant five new bulb beds in the autumn, and to free the original bulb beds of the plants in them as they finish flowering this year. These beds will then be dug up by the children, who enjoy this work most thoroughly, and, later, experience the still greater pleasure of setting seeds, etc., in them.

The following is a list of the

NEW BULBS, ETC., SET IN OUR FLOWER GARDEN,
IN FIVE BEDS FREED FROM EXPENDED ANNUALS
LAST NOVEMBER (1903)

BED 4		<i>Round Centre</i> Italian hyacinths,	
		12.	
<i>Centre.</i>	Lilies of the valley—perennial.	<i>Centre.</i>	Mixed hyacinths,
		12.	
<i>Round Centre</i>	Spanish iris, 30.	<i>Border.</i>	Winter aconite,
<i>Border.</i>	Mixed crocuses,	100.	
50.		BED 13	
BED 7		<i>Centre.</i>	Polyanthus narcissus, 7.
<i>Centre.</i>	Daffodils, 12	<i>Round Centre</i>	Early tulips, 14.
<i>Round Centre</i>	Spanish iris, 20	<i>Border.</i>	Scilla (<i>Campanulata rosa</i>), 50.
<i>Border.</i>	Snowdrops, 100.	BED 16	
BED 10		<i>Centre.</i>	Pheasant-eyenar- cissus, 15.
<i>Centre.</i>	The school lily (<i>Lilium candidum</i> —white or Madonna lily), 1.	<i>Round Centre</i>	Late tulips, 24.
		<i>Border.</i>	Lent lilies, 12.

NEW BULBS, ETC., SET IN SCHOOL BY THE CHILDREN
OF THE VARIOUS CLASSES FOR THE HALL AS
WELL AS FOR THEIR OWN CLASSROOMS,
NOVEMBER 1903

	Class 1.		Class 2.		Class 3.		Class 4.		Class 5.		P.T.'s.		Total.
	Hall.	Class-room.	Hall.	Class-room.	Hall.	Class-room.	Hall.	Class-room.	Hall.	Class-room.	Hall.	Class-room.	
Daffodils.....	4	4	4	4	4	4	4	4	4	4	5	5	50
Lent lilies.....	3	—	2	1	2	—	2	2	—	1	—	—	13
Polyanthus narcissus..	1	1	1	1	2	2	1	1	1	1	2	2	16
Pheasant-eye narcissus	1	—	1	1	1	1	1	1	1	1	—	—	9
Tulips.....	1	1	1	1	1	1	1	1	1	1	1	1	12
Crocuses.....	3	—	3	—	4	—	3	—	—	—	2	—	15
Snowdrops.....	—	—	—	3	—	—	—	3	6	—	3	4	19
Winter aconite.....	—	—	—	—	6	6	—	—	—	—	—	—	12
Hyacinths (in water)..	4	2	—	2	—	1	—	2	—	1	—	—	12
Hyacinths (in earth)..	—	1	—	1	2	2	—	1	—	1	—	—	8
	17	9	12	14	22	17	12	15	13	10	13	12	166

It will be seen from the foregoing lists that we had ample material from which to select subjects for special consideration. During the year 1902 the following were selected. A careful consideration of them will show the relation of the more general work of the garden to the special nature study. Later I will show, by example, how it is related to the rest of the work of the school.

JANUARY. *The sparrows in our garden.* — Previous experience had taught us that these little visitors spoilt our crocuses and peas when they came up, so it was deemed well to study the sparrow a little closely, and to try to know some-

thing of its habits, etc., and how we could entice and keep it away from our garden in the early spring.

FEBRUARY. *Water. Some forms of water—snow and ice, or rain, according to weather.*—The snow made a warm cover for our little plants whilst it was still too cold for them above ground. The ice caused the ground to break up so that the air could pass through and sweeten it. The rain helped the plants to grow. It quenched their thirst on hot days ; it washed the dust from off their leaves ; and on days when no rain came the children watered the plants with water from the playground tap.

MARCH. *The snowdrop.*—

“ The frail snowdrop,
Born of the breath of winter, and on his brow
Fixed like a pale and solitary star,”

was the first flower to appear in our garden, the first floral herald sent to announce the approach of spring.

APRIL. *Seeds in connection with the life of the bean. The germination of the bean, the pea, maize, wheat, etc.*—Beans, peas, maize, wheat, etc., were set to grow in water, on flannel, on sponges, on sand, and in earth, so that the children could actually observe from day to day what happened

in the very early stages of the life of some of the many seeds set in their school garden.

MAY. *The earthworm*.—In digging, etc., in the garden, the children came across many worms. Nothing was, therefore, more natural than to endeavour to know something of the life and habits of these marvellous little creatures, especially as the welfare of the garden depended so much upon them.

JUNE. *The radish*.—The radishes in our garden had reached the stage when they were ready for eating; and, as they were the first vegetable produce of our garden, they naturally received very special consideration. A “grand feast” of radishes, shared by many of the children’s parents and some friends, formed a happy climax to this month’s work. In “pulling” the radishes, care was taken to leave some in the ground to continue and complete their work.

JULY. *The broad bean*.—By this time the broad beans were ready in our garden. They had been saved, with great difficulty, from the depredations of the blackfly, a well-known enemy to broad beans. The broad bean had, therefore, a special interest for us. Its growth had been daily watched by the children, and I remember, on one occasion, when walking down in front of the beds of the

broad beans, how my attention was called to the number of "butterflies" which a child thought had pitched upon the bean plants. The "butterflies" were soon found to be the flowers of the bean.

AUGUST. *The radish flower and pod.*—The radishes left in the ground in June were now completing their work, and as the flowers and pods appeared the children were able to read the further story of the little seeds they had planted in the spring. Sprays of the plant in this stage were pressed and mounted; and whilst some of the seed pods were allowed to mature for the sake of the seed, which was then collected and kept for use during the following spring, pods in the green state were pickled and stored away for later use.

SEPTEMBER. *The runner beans in our garden.*—The scarlet runners and "painted ladies" were now ready to reveal their secrets to us, and some of the fruit found its way to a few of our friends, who fully appreciated the freshly-gathered and therefore tender vegetable.

OCTOBER. *Nature's treasures and treasure boxes.*—This was the harvest time, and many a happy hour was spent in the ingathering of the countless ripe treasure boxes from our garden, and in the

examining, separating, sorting, and packing away of their dainty contents for use during the following spring.

“There is no death! what seems so is transition.”

NOVEMBER. *Bulbs—the solid bulb, or corm, in particular.* Many bulbous plants had been before our eyes during the spring, and as we wanted to add to the number and variety of those already in our garden it was quite time to get the unplanted bulbs put away in their cosy beds. It seemed fitting, therefore, that we should consider some of these bulbs more specifically. As the crocus was to form the subject of special consideration the following March, most attention was directed to the solid bulb, or corm, crocuses and gladioli being set to grow in school as well as in the garden.

DECEMBER. *Christmas.*—All the year, in their intimate relationship with the marvellous things of Nature, the children had been gradually and quietly awakening to the fact of the great love and the wonderful wisdom of the divine Planner who “paints the wayside flower and lights the evening star.” At this season we tried to help our children to realise that great love and wonderful wisdom as expressed in the gift to the world of

the Christ Child. In commemoration of this glad event the rooms were decorated with ivy and other evergreens brought by the children from their homes, as the ivy and other evergreens in our school garden had only just begun to grow.

CHAPTER IV

“ ‘ Come wander with me,’ she said,
‘ Into regions yet untrod,
And read what is still unread
In the manuscripts of God.’ ”

So far, the actual work of gardening in and out of doors has been mainly under consideration ; it will now be interesting to see in what way it is related to the rest of the school curriculum. This will best be shown by a few general remarks followed by a reproduction of some of the plans of work for four or more weeks prepared for my own school.

In the second chapter I very briefly described the *care* by the children of the natural objects indoors. Such work can, of course, only be undertaken with small groups of children. Provision is, however, made that every child shall take part in turn. The remaining children are occupied the while with nature work of another kind ; those of the first class are encouraged to observe and record simple facts about the weather, and changes in the natural objects in their room. This comes under the heading “ Calendar Work.”

In the lower classes the children make more or less temporary pictorial representations on their little blackboards of the plants, etc., in their respective rooms.

Measuring, weighing, money values (the children



“ From the rough sod comes the soft-breathing flower.”

go out with a teacher to buy food for the doves, boxes for window gardening, new seeds, bast, tacks, etc.), are all taken in connection with the nature work and reading and writing wherever possible. Children under five years of age do nothing whatever in the way of reading and writing. They are wholly occupied with nature

work, kindergarten occupations, games, stories, and free play. No reading, number, or writing lessons are ever taken in the afternoon ; so that, with the exception of the very minimum amount of time for needlework and knitting with the girls who have reached six years of age, kindergarten occupations, games, stories, and recitations take up the whole afternoon of even all the children over five years of age, and all this work is directly related to the nature study for the four or more weeks.

Real objects are always used as models in the drawing, modelling, and brushwork lessons, and the children are, of course, encouraged to make their own representations of the same.

It may here be noted that a special point is always made of drawing into the service of the school, for the children as well as for the teachers, the very best literature and art, to supplement the work with the natural objects themselves.

THE PLANNING OF THE WORK

The *real* thing is always the starting-point, and this, as I have shown in my second chapter, is under observation long beforehand, sometimes for as long a period as a whole year.

After some experience with the real thing comes the search for an explanation and a further knowledge of the facts actually observed from the best, and therefore highest, authorities on the subject under consideration.

The point of view from which the subject shall be presented to the children is next determined, then what facts are most suitable for the children and the best means for helping them to find out these facts for themselves.

Lastly, suggestions are offered as to the way in which the children may desire and be helped to reproduce their experiences in concrete form, be it with a few paints and a brush, chalks, or coloured pencils on paper, modelling paste, building bricks, or even pen and ink ; also as to how the ideal side of the subject may be presented in picture, story, game, and verse. The method of procedure thus pursued in preparing for the specific work of each month or longer may be summarised as follows :—

A.—Experience with the real thing.

B. I.—Information or notes for the teacher.

B. II.—The standpoint from which the subject is to be considered with the children.

B. III.—The plan of work with the children.

This includes work in the garden, walks to Greenwich Park or Blackheath, etc.

B. IV.—The gifts, occupations, games, stories, pictures and recitations used in connection.

B. V.—A list of books found useful in connection with B. I. and B. IV.

In reproducing some of the plans of work prepared for my own school, I do not, for I hope obvious reasons, purpose giving the notes or information for the teacher's use. I shall in each case, however, give a list of some of the books which I have found helpful *after* experience with the real thing or phenomenon.

In one year "Wind" was the subject round which our thoughts and work centred during the month of March, when the children had plenty of opportunity of seeing some of its effects in the school garden, as well as elsewhere. The method of procedure was as follows :—

B. II.—THE STANDPOINT WITH REGARD TO THE CHILDREN

"The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh, and whither it goeth."

"The breeze warbles, and the mute still air
Is music slumbering on her instrument."

The phenomena of wind inspire wonder, and stimulate the keenest search for their cause. The

children feel the breath of the wind and hear its voices. They see it moving the plants in their garden and the trees in the road, or they see it blowing the clothes hung out by their mother or someone else to dry. At first the children think that the wind is caused by the moving objects, but by-and-by they begin to realise that the wind is not the effect, but the cause, of the varied movements perceived, and gradually the children rise to a simple conception of a single invisible power behind all things. Then they begin to wonder about the nature of this unseen force. We desire to help the children in this process of spiritual evolution without detracting from the wonder of the phenomena by any questions or explanations which may destroy vigour of mind. The wind cannot be seen; its existence can only be shown by its doings. We therefore lead the children to notice familiar manifestations of the wind's power, and provide opportunities for the observation of other effects of wind in different ways, dwelling largely upon its health-giving power, and as it affects our daily lives. Thus we seek to impress the children with the actual activities of wind, and leave them to make out its spiritual analogies for themselves.

B. III.—PLAN OF WORK WITH THE CHILDREN

Introduce the subject with a chat about the weather. What did the children notice about it on their way to school? (If necessary, recall a recent rough day.) A wind was blowing. Bits of paper, etc., were driven along the roads by it. At times it was difficult to walk against it. All the plants in our garden were bent in one direction. Bits of paper were scattered over the beds and paths. Walls and hedges, etc., are able to stop the wind in its course, unless it be very rough. Sometimes the wind blows the children's hats off. It blows the clothes about which mother hangs out to dry. It helps to dry the clothes. It helps to dry the ground after rain.

Individual children go out and pick up the bits of paper, etc., blown over the beds and paths of the garden. They also help to tie up any plants blown down or bent by the wind there. A line is stretched somewhere in the playground—from the veranda railings—dolls' clothes, dusters, etc., washed by groups of children indoors are hung thereon, and the effects of the wind upon them observed.

The wind flies kites, drives sailing boats, turns windmills, etc. It drives the clouds across the sky, and rocks the little birds in their nests on the trees (nests in some trees near the school recalled).

Kites previously made by the children let fly in the playground.

A little boat with a sail put out on a tub of water in the playground and watched.

Paper windmills made by the children used in the playground.

The children go out into the playground and watch the clouds in the sky during windy weather.

THE WIND AS A SOWER OF SEED

When we want to have some pretty flowers growing in school, what have we to do? Yes; we have to sow some seeds. And when we want to grow some radishes, some lettuces, and cabbages, etc., in our garden, what have we to do? Last year we planted a great many seeds in our garden. The other day, when we went to look at some of the beds, we found some little plants coming up in beds where we had never put any seeds of the kind. Do you remember the names of these little plants? Cornflowers, eschscholtzia, sweet alyssum, and lettuce.

How did these little plants get into other beds? Someone who works and plays, although we cannot see him, must have sown those seeds. The wind sowed them. It blew them from the parent plants, carried them along, dropped them in the new beds, blew dust and leaves over them till they were covered. Then they took root, and now

they have begun to come up. Who knows some little seeds which the wind sows in the fields and among the grass in the park and on the heath ?

Individual children go to the garden to see if they can find any more plants which may have been brought there by the wind.

In the autumn the wind plays with the leaves and sends them whirling to the ground, where they help to keep the little seeds and roots buried there nice and warm. It blows the acorns and chestnuts from the tall trees in the woods and parks. * Recall the visit to Greenwich Park the previous autumn, and how we found the ground strewn with beautifully-coloured leaves, and pretty acorns and chestnuts hidden among many of them. Where are some of those acorns and chestnuts now ? (Growing in our school, in water and in earth.) Sometimes in autumn, too, the wind has a game with the trees in our fruit garden, and then the apples and pears come tumbling down to the ground without any help from us.

THE DIFFERENT WINDS, AND WHAT THEY BRING

Compare the boisterous March winds with the gentle summer breezes—the zephyrs or “life-

* Points with an asterisk against them are only for the upper part of the school.

bringers." Sometimes the wind blows at one side of our house, sometimes at another—that is, it comes from different directions. * The north wind comes from cold countries, and often brings ice and snow. The south wind comes from the countries where the oranges and lemons grow, and brings warmth. The west wind comes from the ocean, and brings moisture—fog or rain ; whilst the east wind travels overland, and brings dry and cold weather.

The first class children refer to their calendars for facts about the winds and what they brought at different times.

THE WEATHER-VANE

The weather-vane on the top of the school tower. * Other vanes or weathercocks recalled. Where are they all usually placed ? Reason why they are placed high up. * Description of the weather-vane. Its uses.

The children go into the playground to look at the weather-vane on the top of the school tower. A small model made of it indoors by individual children.

“ Whichever way the wind doth blow,
Some heart is glad to have it so ;
Then blow it east or blow it west,
The wind that blows, *that* wind is best.”

THE WIND AS THE WORLD'S GREAT PHYSICIAN

Sometimes when we have been in school a long time we feel rather uncomfortable ; then teacher opens the windows and door, and what happens ? Mother too opens the bedroom window every morning after the children are all up and dressed. Why ? And sometimes when we do not feel very well we go out in the air for a few minutes, and then we feel better. So, too, with our indoor plants, our doves, our snails, fish, etc. They all like to be fanned by the wind from time to time ; it makes them feel fresher and happier. Even the beds in our garden are all the better when the wind can fan upon the soil.

Individual children dig up the empty beds in the garden, that the air may sweeten the soil. Individual children appointed to see that the doors of their classrooms are left open during any break in the work, as well as after morning and afternoon school.

THE WIND AS A BEAUTIFIER, A MUSICIAN, ETC.

The wind sometimes helps to clear up our garden and playground by blowing all the untidy bits of paper, dust, etc., into heaps, which can be easily gathered up and taken away. It also makes the trees and plants look tidy by sending down all the leaves which have done their work on them to

the earth, to make, perhaps, a cosy blanket for the little seeds lying there. Very often when we have been out in the wind for a little while our cheeks get fresh and rosy, and so too the south wind helps to make the fruit on the trees in our gardens pretty in summer and autumn. The wind makes the little flowers nod their heads, the leaves of the trees dance, and the grass wave to and fro. Nature is more lovely when in movement than when still, and all her charms of motion are due to the *Wind*. The wind makes wonderful music in the woods. Sometimes it whispers, sometimes it sighs, moans, whistles, etc. * Recall "the sough of the rain-laden sou'-easter that mourns its requiem over the fast-falling leaves in late November."

Visit to Greenwich Park. The effect of the wind on the grass, the flowers, and trees observed ; also the sound of the wind through the trees— "Eolian whispers rippling and ruffling the newly-opened leaves."

The older children make an Eolian harp indoors, and place it in one of the windows of their class-rooms. They notice the beautiful music produced when the wind blows across the strings of the harp.

THE WIND AIR IN MOTION

Sometimes we neither hear nor feel any wind the air is so still, and we say there is not a breath

of air going. Grown-up people often use a fan then. When they move it backwards and forwards near their face, they feel some cool air or a gentle wind being driven towards them ; so * whenever we feel a wind blowing, it is only air being driven towards us, for wind is air busy at work.

Paper fans, previously made by the children, used, and the effects described.

The children move the hand backwards and forwards from right to left, and then describe the effect. The same experiment with a wet hand.

Note.—In keeping the records of the weather, etc., the attention of the children is to be specially directed to the phenomena of wind this month.

WORK IN THE GARDEN

Picking up the pieces of paper, etc., blown on the beds and paths by the wind.

Tidying of borders.

Tying up and, if necessary, giving a support to any plants bent or blown down by the wind.

Digging up the empty beds, that the air may sweeten the soil.

Clearing the soil of any grubs, etc., which would likely be productive of injury to the plant later on.

Sowing of vegetable and flower seeds.

B. IV.—THE GIFTS, OCCUPATIONS, GAMES, STORIES, PICTURES, AND RECITATIONS USED IN CONNECTION

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
DRAWING (Free and other).	Ship with sails; weather-vane; windmill; clothes drying on a line; seeds of sycamore, maple, fir, pine, etc. (from school store); wind-flower or anemone, dandelion; vase; tree near the school (poplar).	Ship with sails; weather-vane; windmill; seeds of sycamore, maple, fir, pine, etc.; wind-flower or anemone, dandelion; vase; tree near the school (poplar).	Ship with sail, fan, roof of a house from which smoke seems to be issuing, sycamore and maple seeds, wind-flower or anemone, small branch of a poplar-tree.	Boat, nest in a branch of a tree, fan, poplar leaves, sycamore and maple seeds.	Kite, window, tub, clothes line and pegs.	Air balloons, clothes-peg, kite, flag.
BRUSHWORK AND COLOURING.	Boat sailing on the sea; seeds of sycamore, maple, fir, pine, etc.; anemones, dandelions.	Boat sailing on the sea; seeds of sycamore, maple, fir, pine, etc.; anemones, dandelions.	Clothes drying on a line, boy running after his hat, fan, flag, anemone, vase.	Kite, boat, flag, poplar leaves.		
MODELLING.	Ship ("sails" prepared by babies added), windmill, weather-vane, vase, wind-flowers.	Ship ("sails" prepared by babies added), windmill, tub, vase, wind-flowers (<i>side view</i>).	Window, ship with sail, flag, fourfold screen, fan.			
PAPER FOLDING.	Ship with sails, double flower-vase, small balloon, threefold screen.	Kite, windmill, flower-vase, sailing-boat.				Tails for kites.
CANE AND PAPER WORK.	Kites to fly in the playground.	Kites to fly in the playground.				
PAPER CUTTING AND FOLDING.	Wind toys for use in the playground.	Wind toys for use in the playground.	School or church with paper weather-vane added, window, garden, street, boat, chimney, fence, wall, windmill (<i>on the flat</i>).			
GIFT IV.		School or church with paper weather-vane added, window, garden, street, boat, chimney, windmill, (<i>on the flat</i>).		School or church with paper weather-vane added, roof, window, garden, street, windmill (<i>on the flat</i>), chimneys.	School or church with paper weather-vane added, roof, window, garden, street, wall, chimneys, pond.	
GIFT III.						

TABLETS (Squares).					Objects made with Gift III, reproduced on the flat.				
RINGS AND STICKS.					Kite, boat with sail, tub, windmill, fan, vase, wind-flower, tree.				
STICKS OR LATHES.					Boat, tub, window, fan, roof of a house with chimneys, windmill, tree.				Boat, tub, window, fan, tree, flag.
JOINTED LATHES.									
THREAD LAYING.									Kite, boat, flag, tub, dolly's stocking, balloon, pond.
SANDWORK.									Garden with flowers bent by the wind, park.
PRAYING.									Wind "dolls" for the garden to keep the birds from the young plants, white "sails" for ships modelled in Classes I. and II.
BEAD THREADING.									Chains for boats.
GAMES.									The Trees. Rock-a-bye, Baby (nurse's song). Washing day. The Weather-vane.
STORIES.									A Wind Story. A Storm in a Tub.
PICTURES.									As in IV.
RECITATIONS.									
HYMN.									As in I.

B. V.—LIST OF BOOKS REFERRED TO FOR
INFORMATION AND READING¹

Natural Philosophy (Ganot's *Cours élémentaire de Physique*), E. Atkinson, Ph.D., F.C.S.; *Encyclopædia Britannica*; *Information for the People* (Vol. I.), Chambers; *Why the Wind Blows* (Science for All, Vol. I.); *How the Wind Changes* (Science for All, Vol. II.); *Physical Geography*, A Geikie, F.R.S.; *Earth, Air, and Sky*, R. Bunting; *Life: its Nature, Varieties, and Phenomena*, Leo. H. Grindon; *The Queen of the Air*, Ruskin; *Letters to a Mother*, S. E. Blow; *Commentary on the Weather Vane*, Froebel (S. E. Blow's translation); *Two Children of the Foothills*, Elizabeth Harrison; *The Wind in the Tree* (the Tree Book), M. R. Jarvis; *The Odyssey* (Books V. and X.), Pope's or Butcher and Lang's translation; *The Æneid* (Book I.), Dryden's translation; *The Four Winds* ("Hiawatha"), Longfellow; *The White Man's Foot* ("Hiawatha"), Longfellow; *The Winds*, Bryant; *The Evening Wind*, Bryant; *Sweet and Low* ("The Princess"), Tennyson.

¹ Most of the books referred to in this and subsequent chapters are to be found in the Library of the British Museum. A long list is given because some of the books may be more easily obtained in some districts than in others.

LIST OF BOOKS FROM WHICH THE GAMES, STORIES,
AND RECITATIONS HAVE BEEN SELECTED

Holiday Songs and Everyday Songs and Games, Emilie Poulsson ; *Kindergarten Chimes*, K. D. Wiggin ; *Songs for Little Children* (Vols. I. and II.), E. Smith ; *Songs, Games, and Rhymes for the Nursery, Kindergarten, and Primary School*, E. L. Hailmann ; *Song Stories for the Kindergarten*, Mildred J. Hill ; *Little Games for Little People*, Dora Pearce ; *Little Songs for Little Voices* (Book I.), Alfred Scott Gatty ; *The Child's Song and Glee Book* (Part II.), H. Keatley Moore, Mus. Bac., B.A. ; *Songs and Music of Froebel's Mother Play*, S. E. Blow's edition ; *The Daisies and the Breezes*, L. Ormiston Chant ; *In the Child's World*, Emilie Poulsson ; *Mother Stories*, Maud Lindsay ; *The Story Hour*, K. D. Wiggin and N. A. Smith ; *Child Garden*, March 1901 ; *Kindergarten Stories and Morning Talks*, S. E. Wiltse ; *The Child World*, Gabriel Setoun ; *A Child's Garden of Verses*, R. L. Stevenson ; *Sing Song*, Christina Rossetti ; *Primary Education*, March 1902 ; *A Book of Verses for Children*, E. V. Lucas.

CHAPTER V

“ All's love, yet all's law.”

IN the last chapter I said that the best way to show how our school gardening is related to the rest of the school curriculum would be to reproduce some of the plans of work prepared for my own school for four or more weeks. I started with a natural phenomenon—namely, “ Wind.” I now purpose in this and the following chapters to take in turn a flower, an animal, a vegetable, and some other product from our garden, or another natural phenomenon affecting it. In this way it will be seen what abundant material even a little garden offers for nature study, and how closely related are all living things, all natural phenomena, and all products of the earth—that “all are but parts of one stupendous whole.”

One April and part of the following May the daffodil (*Narcissus pseudo-narcissus*) and its nearest relations, the pheasant-eye narcissus (*Narcissus poeticus*) and the clustered or polyanthus nar-

cissus (*Narcissus Tazetta*), were under special consideration.

B. II.—THE STANDPOINT WITH REGARD TO THE CHILDREN

“The narcissus wondrously glittering—a noble sight for all, whether immortal gods or mortal men; from whose root a hundred heads spring forth, and at the fragrant odour [thereof] all the broad heaven above and all the earth laughed, and the salt wave of the sea.”—*Hymn to Demeter*.

The daffodil is the glory of the spring garden. Its many varieties occupy a prominent place in the year's procession of beautiful flowers. They come at a time when flowers from the open border are very scarce, and bloom in succession from the beginning of March to the middle of May. Growing hardly out of doors, they cost but little beyond loving care. Most of the flowers when cut last in water ten or more days, and delight our eyes with their elegance, grace, and beauty.

Last November the children set upwards of two hundred daffodil and narcissus bulbs in the school garden and their classrooms. During all the winter months, these, as well as the many other bulbs set in the fall, were carefully tended and watched by the children. The delight with which the first visible sign of life was hailed cannot be described,

much less the joy which the opening flowers, with their marvellous subdued glitter upon them, now hourly afford children and teachers alike.

The daffodil and its nearest relations are indeed flowers over which one can lovingly linger awhile,



“ Earth breathes the air of Paradise.”

and ever find new beauties to delight and refresh one's soul.

“ He that has two cakes of bread, let him sell one for some flowers of the narcissus ; for bread is food for the body, but narcissus is food for the soul.”

B. III.—PLAN OF WORK WITH THE CHILDREN

Bulb time recalled. The names of the bulbs set then by the children in the garden as well as in school. * The appearance of the bulbs of

the daffodil, the pheasant-eye narcissus, and the polyanthus narcissus recalled. What have the bulbs been doing down in the earth all the winter-time? Mother Nature has kept them warm and safe there from Jack Frost until the sun said it was time for them to rise up and make the earth look pretty. The gradual appearance of the tender shoots and the whole daffodil plant detailed by the children.

The first class children refer to their calendar for dates, etc., marking special facts in the life and growth of their daffodils.

Visit to the garden. How pretty it now looks with its "host of golden daffodils fluttering and dancing in the breeze."

The number of daffodils right out in each bed counted by the children.

THE DAFFODIL PLANT

The daffodil as seen growing in the garden and in the flower-pots in school. Its general appearance. Effect of the light on the beautiful flower crown.

The daffodil plants in the classrooms and the hall examined. The number of flowers right out in each case.

The height of the tallest, of the shortest, plant found out by individual children; also which are higher at this stage, the leaves or the flowers.

A support given to any of the daffodils bending over with their own weight

Watering of the plants. A plant placed where the light falls well upon it, and the effect on the flower noticed.

Visit to Greenwich Park. Beautiful daffodils found there.

THE FLOWER-BUD

The still unopen bud stands straight up whilst the bud, gradually unfolding, bends more and more. * Why? The sheath; its appearance when protecting the bud, when the bud has opened out.

Visit to the garden, to see whether any daffodil buds are to be found there now. If so, how many are still quite shut up, and how many have begun to unfold.

The number of buds still shut up or opening out on the plants in the hall and in the classrooms.

Examination of the sheath in each case.

THE FULL-BLOWN FLOWER

The beautiful flower of the daffodil. How it is placed on the stalk. Its colour, shape, and size. The lovely crown, its crinkled edge, the pretty flower leaves round it. Some daffodils have flowers with long crowns, whilst others have flowers with short crowns. What we see when looking inside the crown of a daffodil flower. (No

child is ever allowed to pull a flower to pieces ; indeed, it should not be permitted in *any* infants' school.) * What might happen if the daffodil flower were always erect like a cup.

A cut flower is provided for every two children to examine.

At the end of the lesson individual children gather up all the flowers and arrange them carefully in a bowl of fresh water.

What we notice below the daffodil flower. The seed box, the little stalk more or less concealed by the sheath. The big flower stalk (the scape). From whence does it spring ? Its colour, its height, its hollowness, flatness, etc. The tendency to twist.

Cut flowers again distributed for examination, and at the end of the lesson gathered up and arranged in a bowl of fresh water as on previous occasion.

THE FOLIAGE LEAVES

From whence do the leaves of the daffodil spring ? How many do we find on a plant ? Their shape, colour, size, veining, etc. Their appearance after the flowering time.

Plants in the classrooms and from the hall examined. A plant in a broken pot reset. The children notice thereby from whence the daffodil leaves spring.

SOME RELATIONS OF THE DAFFODIL

The daffodil has, like many grown-up people and little children, a number of relations. We have some of them in our garden and in our school. Does any little child know any of them? This narcissus (the teacher points to a special plant on her table) is one; but the family name of the daffodil is *Narcissus*, so we must give this pretty plant its own special name when we speak of it. Its flower, with the lovely looking "ring" in the centre, made people think of the eye of a very fine bird (the pheasant), and so they called this kind of narcissus the "pheasant-eye narcissus." We have, therefore, daffodil narcissus and pheasant-eye narcissus. * Our old friend daffodil narcissus got its own pretty special name daffodil from a word meaning "that which cometh early" (*affo-dyle*). Can the children now think why it got that name? When did the daffodils begin to appear in our garden, in our school, etc.?

The children of the first class refer to their calendars for the actual date when the first daffodil appeared in the garden, in the school.

THE PHEASANT-EYE NARCISSUS

The delicate flower, Its colour, shape, and size.
Its sweet perfume. The smallness of its crown,

which is almost only a ring. Saucer-like shape. The flower leaves round. The flower tube. Its length, etc. The dust spikes or stamens: their number and arrangement. The sticky "head," or stigma, etc.

The school plants are examined; straggling ones are tied up, those in the garden as well as those indoors.

THE PHEASANT-EYE NARCISSUS COMPARED WITH THE DAFFODIL

Some likenesses, some differences found.

Cut specimens are distributed. At the end of the lesson these are gathered up and arranged in a bowl of fresh water, as on previous occasions.

THE POLYANTHUS OR CLUSTERED NARCISSUS

Another relation of the daffodil in our garden and in our school.

The clusters of pretty, delicate flowers, each flower having in the centre a small neat cup, often of a different colour from the leaves that form the circumference of the flower. Colours of the specimens in the garden, in the school. The sweet perfume of the flowers. * Why this member of the narcissus family gets the special name "polyanthus," etc.

Visit to the garden, to find out in which beds the

daffodil and any of its known relations are to be found. Of which do the children find the greater number?

The polyanthus narcissus compared with the daffodil and pheasant-eye narcissus. Why we like these flowers.

Some flowers gathered from the garden and sent to a sick comrade.

Another visit to Greenwich Park. Relations of the daffodil found there.

THE FRUIT ¹ OF THE DAFFODIL AND ITS KNOWN RELATIONS

The appearance in each case of the ripened seed box. How it opens. What is seen inside. The number of the divisions. * The seeds: how arranged in the "box"; their size, colour, etc.

The fruit left in each case to ripen in the garden or in the school, gathered when sufficiently ripe, and examined. Seeds then stored away for planting in the autumn.

Lifting of the bulbs of the plants under consideration. The leaves of our daffodil and other narcissus plants are all turning yellow. The bulbs have done their work for this season; now they need a little rest. We will lift them out of the earth, and put them in a nice dry place.

¹ This must only be taken when the fruit is ripe, which may not be before the end of June, or even later.

Bulbs in pots, and in some of the beds in the garden, carefully lifted when the foliage of the plants has turned yellow. The children then notice the roots.

Our bulbs do not look quite the same as when we put them in the earth last November. Little baby bulbs have come. These will be able to grow alone, now, if we give them a nice home.

Offsets removed from the bulbs and replanted.

Bulbs spread out to dry ; storing of them away until the time for replanting comes again.

WORK IN THE GARDEN

Watering the plants.

Tidying of beds.

Tying up the straggling leaves of any of the bulbous plants.

Giving a support to flowers needing it, notably the hyacinths.

Plaiting the leaves of spent crocuses and turning their ends into the soil.

Gathering in of ripened seed boxes of any of the bulbous plants, such as the crocus. Storing of the same for future use.

Clearing of spent beds and weeding.

Spring sowings completed.

B. IV.—THE GIFTS, OCCUPATIONS, GAMES, STORIES, PICTURES, AND RECITATIONS USED IN CONNECTION

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
DRAWING (Free and other).	Daffodil flower - buds unopened, partially opened; the full-blown flower; flowers and leaves of daffodils with long crowns, with short crowns in a glass or vase; daffodil plant in a pot; the pheasant-eye narcissus, the polyanthus narcissus; plan of the school garden, daffodil and narcissus beds indicated thereon.	Daffodil flower - buds unopened, partially opened; the full-blown flower; flowers and leaves of daffodils with long crowns, with short crowns in a glass or vase; daffodil plant in a pot; the pheasant-eye narcissus.	Daffodil flower - buds unopened, partially opened; the full-blown flower; the daffodil with a long crown, with a short crown; daffodil plant in a pot; the pheasant-eye narcissus.	Daffodil leaves; daffodil flower-buds unopened, partially opened; the flower of a daffodil with a long crown, with a short crown; vase, flower-pot, basket, watering-can.	Daffodil leaves, buds, and flowers; glass, flower-pot, basket.	Daffodil leaves, buds; basket, flower-pot.
BRUSHWORK AND COLOURING.	Daffodil bud, flowers of the various kinds in the garden or school, flower and leaves.	Daffodil bud, flowers of the various kinds in the garden or school, flower and leaves.	Daffodil bud, flower in a vase, flower and leaves.	Daffodil leaves, flower, vase.		
MODELLING.	Daffodil buds, flowers with long crowns, with short crowns, flower and leaves; pheasant-eye narcissus; plan of the portion of the garden belonging to the class for the year.	Daffodil buds, flowers with long crowns, with short crowns, flower and leaves, vase, basket, flower-pot.				
PAPER FOLDING.	Double vase, basket, bags and boxes for seeds, flower-pot, basket (square-shaped paper).	Vase, bags and boxes for seeds, flower-pot, basket (square-shaped paper).	Window, vase, boxes for seeds, basket, cupboard in which garden tools are kept (square-shaped paper).			

GIFT IV.	Garden enclosure, garden fence, park gates, basket, the school garden (collective work).	Garden enclosure, garden fence, park, park gates, basket, flower-stand, flower-box.	Flower - stand, window, garden, window, gates, pump, front of cup board in which garden tools are kept.	Flower - stand, window, garden, park gates, front of tool cupboard.	
GIFT III.			Objects made with Gift III, reproduced on the flat.		
TABLETS (Squares).					
RINGS AND STICKS.			Flower - bud, vase, basket, flower-pot, wheel-barrow, watering-can.		
STICKS OR LATHS.			Flower-pot, window, basket, vase, fence, pump, watering-can.	Flower-pot, window, basket, vase, garden, fence.	Flower-pot, window, basket, vase, garden, fence.
JOINTED LATHS.				Flower-pot, window, vase, basket.	
GIFT II.				Exercises with the cylinder (roller for the sand garden, etc.).	Exercises with the cylinder (roller for the sand garden, etc.).
THREAD LAYING.				Bud, flower, basket, vase, flower - pot, window.	Bud, flower, basket, vase, flower - pot, window.
SANDWORK.				Garden in spring, park, meadow.	Garden in spring, park, meadow.

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
PRAYING.						Mats to go under flower vases in school, "wind dolls" for the garden to keep the birds from the young plants, little brooms to tidy up the paths in the sand gardens.
BEAD THREADING.						Chains of the following colours:— green and yellow, white and yellow, white and red, to suspend flower-baskets from gas or other brackets in the rooms.
GAMES.	The Spring has come, May Day.	Daffy-down Dilly Blue Bell.	Daffodils, Daistes are Dancing.	Spring. The March of the Flowers.	The Sunshine's Message. All the birds have come again.	Daffodils and Tulips. To the Great Brown House. Come, Children, with me to the garden. In my little garden bed. Guessing by Smell.
STORIES.	Persephone.	Pippa's Spring Day.	How the south wind helped the gardener.	Spring's New Dress.	Up in the Spring.	A Bunch of Daffodils.
PICTURES.*	Spring (Ruysdael).	The Sower (Millet).	In the morning sow thy seed (Fitzroy).	Spring Months (Fitzroy).	Happy days of Spring (Forman).	Spring (Knaus).
RECITATIONS.	How the flowers grow.	Daffodils, Welcome.	Spring is coming.	We love to go a roaming.		
HYMN.	"All is bright and cheerful round us" (adapted).	As in I.	As in I.	As in I.	As in I.	As in I.

* Whilst the pictures selected for Classes III.-VI. may be used in turn in any class, those chosen for Classes I. and II. are more suitable for the older children.

B. V.—LIST OF BOOKS REFERRED TO FOR
INFORMATION AND READING

English Botany (Vol. IX.), Sowerby and Syme ; *British Flora*, Bentham and Hooker ; *Manual of British Botany*, Babbington ; *The Vegetable Kingdom*, Lindley ; *The Book of the Daffodil*, Rev. S. E. Bourne, B.A. ; *Encyclopædia*, Chambers ; *An Encyclopædia of Gardening*, T. W. Sanders, F.L.S., F.R.H.S. ; *Familiar Wild Flowers* (Vol. II.), F. E. Hulme, F.L.S., F.S.A. ; *Familiar Garden Flowers* (Vol. V.), F. E. Hulme, F.L.S., F.S.A., and Shirley Hibberd ; *Wayside and Woodland Blossoms*, Edward Step ; *The Everyday Book*, Cundall and Step ; *Proserpina*, Ruskin ; *Schul Naturgeschichte : Botanik*, Leunis ; *Pflanzenkunde*, Lüben ; *Essay on Gardens*, Bacon ; *The Garden*, Abraham Cowley ; *The Poetry of Plants*, Hugh Macmillan, D.D., LL.D., etc. ; *To Daffodils*, Herrick ; *The Sensitive Plant*, Shelley ; *I wandered lonely as a Cloud*, Wordsworth ; *May Day*, Emerson ; *Hymn to Demeter* (the Homeric Hymns), Lang's or Edgar's translation ; *Demeter and Persephone*, Tennyson ; *Pippa Passes*, Browning ; *Spring*, Eliza Cook.

LIST OF BOOKS FROM WHICH THE GAMES, STORIES,
AND RECITATIONS HAVE BEEN SELECTED

Songs for Little Children (Vols. I. and II.), E. Smith ; *Songs, Games, and Rhymes for the Nursery, Kindergarten and Primary School*, E. L. Hailmann ; *Kindergarten Chimes*, K. D. Wiggin ; *Song Stories for the Kindergarten*, M. J. Hill ; *Fifty Children's Songs*, Carl Reinecke ; *Little Songs for Little Voices* (Book I.), Alfred Scott Gatty ; *Songs and Music of Froebel's Mother Play*, S. E. Blow's edition ; *Toddlekin's Action Songs*, L. Ormiston Chant ; *Nature Songs*, F. Hoare and C. H. Lewis ; *Music for the Kindergarten*, E. Heerwart ; *Child Garden* (Vols. III., V., and VI.) ; *Primary Education* (Vol. X.) ; *The Child World*, Gabriel Setoun ; *A Book of Verses for Children*, E. V. Lucas ; *Little Folk's Land*, H. G. Groser ; *Rhymes and Finger Plays*, selected or written by Lucy R. Latter for the "Everyday Life Series of Pictures," published by W. & A. K. Johnston.

CHAPTER VI

“ Still as my horizon grew,
Larger grew my riches too.”

Now I proceed to reproduce an example from the animal world, to show further how our school gardening is related to the rest of the school curriculum.

The latter half of one May and the first half of the following month the earthworm (*Lumbricus terrestris*) was the subject under special consideration.

B. II.—THE STANDPOINT WITH REGARD TO THE CHILDREN

“ If thy heart be right, then will every creature be to thee a mirror of life and a book of holy doctrine.”—
THOMAS À KEMPIS.

We choose the earthworm as a subject for special consideration this month because we wish to instil into our children a reverence for the lowly organised creature, which they are continually meeting with in their little school or home gardens, and also in the parks or fields round about. We try to do this by leading the children to realise what a very important part earthworms play in the history of the world by preparing the ground for

the growth of fibrous-rooted plants, and for seedlings of all kinds. They sift and loosen the soil so that the rain can sink into it and supply the roots of plants with air and moisture. They cover



SUMMER-TIME IN OUR GARDEN

“ With every day some splendours strange !
With every hour some subtle change !
Of our plain world how could we guess
Such miracles of loveliness ? ”

up with their “ castings ” the bones of dead animals, the harder part of insects, the shells of land molluscs, etc. ; these decay and enrich the soil. They take an infinite number of dead leaves into their burrows, and convert them into vegetable

mould. The burrows further facilitate the penetration of the roots into the soil.

Says Darwin : “ When we behold a wide turf-covered expanse, we should remember that its smoothness, on which so much of its beauty depends, is mainly due to all the inequalities having been slowly levelled by worms. It is a marvellous reflection that the whole of the superficial mould over any such expanse has passed, and will again pass, every few years through the bodies of worms. The plough is one of the most ancient and most valuable of man’s inventions ; but long before he existed the land was in fact regularly ploughed, and still continues to be thus ploughed, by earth-worms. It may be doubted whether there are many other animals which have played so important a part in the history of the world as have these lowly organised creatures.”

B. III.—PLAN OF WORK WITH THE CHILDREN

Recall the preparing of the beds in the garden for the spring sowings. When the children were digging the earth they found a number of little creatures in it ; and they had to be very careful, lest they should hurt them with their spades. Do the children remember what some of these creatures were ? Worms. Yes ; and the plants would not

grow nearly so well in our garden if there were no little worms there. We will see if we can find a few in the garden to bring over to school for a little while. If we take great care of them, perhaps they will help us to find out some of the wonderful things which they do. We must prepare a nice home for them. What kind of home would they like to have? Where did the children find the worms in the garden? In the earth. Then they must have earth to live in in school; and we must see that it is nice and moist, for the little worms do not like dry or sandy soil.

Individual children go to the garden in search of a few worms. Preparation meanwhile of temporary home. Pots or boxes, partly filled with moist earth. Worms from the garden carefully placed in these temporary homes and fed. At the end of the lesson a piece of glass is placed over the pots or boxes, and then a piece of black paper or cloth over that.

What the worms do. How they feed. What they feed on. Some of the things they like.

Examination of the pots or boxes in which the worms have been temporarily housed. (If the black paper or cloth be suddenly removed, the worms may be seen working on the surface of the earth.)

The children feed the worms from day to day with different kinds of food—such as bits of cabbage leaves, onions, carrots, etc.—and find out thereby what the worms like best.

The children notice the condition of the earth in the pots or boxes also from day to day, and moisten the same whenever necessary.

At the end of the lesson some half-decayed leaves put on the surface of the pots or boxes.

What has happened to the leaves which the children recently put on the surface of the pots or boxes in which the worms are being temporarily kept in school? The worms have evidently done something with them. We will see if we can find out what has happened to the leaves.

Examination of pots or boxes. The half-decayed leaves found to have been dragged down into the earth. If possible, the children examine one or more of these leaves; their edges will probably be found to have been "nibbled."

HOW THE WORM MOVES

It crawls, climbs, and wriggles. The crawling movement is slow. Why? The little creature can, nevertheless, retreat very rapidly into its hole if suddenly disturbed when working on the surface of the earth. The children recall instances of this noticed when working in the garden from time to time.

Individual worms watched, and their movements described. (One worm for every two children will suffice. Each of the specimens to be distributed among the class in this and succeeding lessons must, for the sake of the worm, be

put in a sand or modelling tray, with a little moist earth.) The children observe the furrow-like track made by the worm on soft, damp soil.

THE FORM, COVERING, AND COLOUR, ETC., OF THE
WORM

The long "ringed" body. Its soft, slimy covering. The colour of the same. The pretty stripe along the whole length of the middle of the back of the little creature. The peculiar swelling of one part of the body. The name given to that part. The colour of the "saddle" or "girdle." The "bristles." How they help the worm in its movements.

Individual worms distributed for examination in sand or modelling trays in moist earth, as on previous occasion. The children are allowed to pass their finger very gently from tail to head along the under part of the worm's body, and then say what they observe. Individual children are allowed to let their worms crawl over some paper on their teacher's table. The effect is noticed.

Its tapering form. The peculiar mouth (a good drawing useful here). The overhanging lip : its use to the worm. The absence of teeth, yet the creature feeds on some leaves and other kinds of solid food.

Individual worms examined as before. The children distinguish between the head and the tail by the more pointed shape of the former.

* SENSE ACTIVITIES OF THE WORM

The absence of eyes; the worm sensitive, nevertheless, to light. Its delicate sense of touch. No sense of hearing, yet extremely sensitive to vibrations. A sense of taste, shown in the preference for certain kinds of food. A feeble sense of smell.

A strong light is brought near some worms on a tray of moist earth on the teacher's table. The effect on the worms observed. The children are allowed to touch or blow upon the front or "head" part of the worm's body very gently, and notice what happens. A child is allowed to sound a whistle very loudly near the worms on the teacher's table. The worms do not seem at all frightened.

The teacher strikes a tuning-fork on her table near the worms. The children notice what happens—the effect of the vibrations on the little creatures.

Individual children describe what they sometimes notice when working in the garden—how the shaking of the spade in the earth often makes worms even a little way off come up out of their holes.

The children recall the feeding of the worms from day to day, and name some of the things they seemed to prefer.

The children describe how the worms were able to find bits of onion hidden in the earth of their temporary houses.

HABITS OF THE WORM

Where and how the worms live. The special name of the worm the children have been keeping

in school. The channel-like dwellings. * How the earthworms make them. What we sometimes find near the openings of these channels or burrows.

Individual children see if they can find any traces of burrows in the pots or boxes of earth in which they have been keeping the school worms for a little while. Other children search in the garden for earthworm burrows.

When do the earthworms come above ground ? When do they come out of their burrows in search of food ? Earthworms do not go far from home, because they are not very clever in finding their way. They will often keep the tail end of their body in their burrow, so as not to lose the way.

How and what the earthworms use to plug up the entrance to their homes ?

What becomes of the earthworms in the winter ?

The children recall the kind of days when plenty of earthworms appear above the ground, also the time of the year when they appear at all. Instances recalled of earthworms having been seen half in and half out of their burrows by the children when working in the school garden.

Individual children see if they can find in the garden any burrows which have been plugged up.

THE WORK AND GREAT USEFULNESS OF EARTHWORMS

Earthworms plough the ground for us. How ?

* Their "casts." What are they ?

Shells, bones, and leaves are constantly being covered with "castings," and these decay and enrich the soil. Earthworms also further constantly loosen the soil by making new burrows to replace their old ones, which are continually falling in. They drag leaves and similar substances underground and convert them into vegetable mould.

Thus there is every reason for protecting such wonderful and useful little creatures.

The children look in the garden for earthworm "casts," also in the temporary homes of the worms which have been in school these weeks.

All the school earthworms put back into the garden, also the earth in which they have been kept. The empty pots or boxes stored away until required again.

WORK IN THE GARDEN

Any earthworm capsules or egg cases found in the garden brought into school, placed in a temporary "home," taken care of, and watched by the children.

Collecting of any ripened seed boxes from the bulb beds, and gathering up of the withered leaves. Thinning out and transplanting from any overcrowded beds such plants as lettuces, radishes, carrots, onions, mignonette, eschscholtzias, stocks, marigolds.

B. IV.—THE GIFTS, OCCUPATIONS, GAMES, STORIES, PICTURES, AND RECITATIONS USED IN CONNECTION

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
DRAWING (Free and other).	Earthworms; flower-pot filled with earth (temporary home of school worms); carrot; vertical and also transverse sections of an onion; leaves found in the garden and park, such, for instance, as leaves of cabbage, turnip, carrot, primrose, lime, hazel, etc.; head of celery, if still obtainable; stick of horse-radish; garden tools—spade, fork; earthworm casts; plan of the school garden.	Earthworms; flower-pot filled with earth; carrot; vertical and also transverse sections of onion; leaves found in the garden and park, such, for instance, as leaves of cabbage, carrot, primrose, lime, hazel, etc.; head of celery, if still obtainable; stick of horse-radish; garden tools—spade, fork; plan of the garden belonging to the class for the year.	Earthworms; flower-pot filled with earth; carrot; onion; leaves found in the garden and park, such, for instance, as leaves of cabbage, nasturtium, lime, maple, etc.; garden tools—spade, fork.	Earthworms; front view of flower-pot, of box in which the school worms are being temporarily kept, carrot, onion, cabbage leaf, spade, fork.	Earthworm; front of flower-pot, of box, carrot, onion, cabbage leaf, spade.	Earthworm; front of flower-pot, of box, carrot, onion, spade.
BRUSHWORK AND COLOURING.	Earthworms; carrot; onion; leaves of cabbage, carrot, lime.	Earthworms; carrot; onion; leaves of cabbage, lime.	Earthworms on surface of earth in a box in which they are being kept for a while in school; carrot; onion; leaves of cabbage, lime.	Earthworms; onion, carrot, cabbage leaf.		

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
JOINTED LATH (Class V.). FRAYING (Class VI.).					Flower-pot, garden trellis, summer-house, spade, garden fork, carrot.	Mats to go under flower-pots and boxes in which the worms are temporarily kept in school, little brooms for the sand garden, park, &c.
GIFT II.					Exercises with the cylinder (roller for the sand garden, park, etc.).	Exercises with the cylinder (roller for the sand garden, park, etc.).
SANDWORK.					Garden, park, field, burrows indicated, and tiny "bead-worms" added.	Garden, park, field, burrows indicated, and tiny "bead-worms" added.
THREAD LAYING.					Worm, cabbage leaf, onion, carrot, spade, fork, flower-pot.	Worm, onion, carrot, spade, flower-pot.
BEAD THREADING.						Little "worms" for the sand garden, park, etc.
GAMES.	The Rain Coach. Sister May.	Oh, the lovely, lovely May! Shower and Flower.	May Dance. Straight and Tall in the Garden.	The Waking Flowers. See millions of bright raindrops.	The Sunbeams. The Little Gardener. Rain Song. The Garden.	The Sunshine's Message The Little Plant. Rain Song (another). Merrily We Dance.
STORIES.	The Little Worm that was Glad to be Alive.	The Story of the Spring.	Squirmey.	The Flower Children (adapted).	The Sunbeam Fairies.	Carl and the Earth-worms.
PICTURES.	Ploughing (Rosa Bonheur).	As in I.	Pictures of the Month (Fitzroy).	As in III.	The Working Man's Garden.	As in V.
RECITATIONS.	Turn, turn thy hasty foot aside (selected verses from Gisborne's poem).	What a Worm says.	The Worm (adapted from Ann Taylor's poem).	Do not Hurt the Little Worm (from the German). Rain in Spring.		
HYMN.	All things bright and beautiful.	As in I.	As in I.	As in I.	As in I.	As in I.

B. V.—LIST OF BOOKS REFERRED TO FOR
INFORMATION AND READING

Vegetable Mould and Earthworms, Darwin ; *Text-book of Zoology*, Nicholson ; *Text-book of Zoology treated from a Biological Standpoint* (Vol. III.), Dr Otto Schmeil, English translation by Rudolph Rosenstock, M.A. ; *Science for All* (Vol. IV.) ; *Natural History*, J. G. Wood, M.A., F.L.S. ; *Animal Life*, F. W. Hackwood, F.R.H.S. ; *Nature Study in Elementary Schools*, Mrs L. L. Wilson, Ph.D. ; *Primary Education* (Vol. X.) ; *Thierkunde* (Vols. I. and II.), Lüben ; *Schul Naturgeschichte : Zoologie*, Leunis ; *Nature Study and Related Literature*, A. E. M'Govern.

LIST OF BOOKS FROM WHICH THE GAMES, STORIES,
AND RECITATIONS HAVE BEEN SELECTED

Songs for Little Children (Vols. I. and II.), E. Smith ; *Little Songs for Little Voices* (Book III.), Alfred Scott Gatty ; *Stories in Song for Kindergarten, Home, and School*, Emerson and Brown ; *Song Stories for the Kindergarten*, M. J. Hill ; *Little Games for Little People*, Dora Pearce ; *Songs and Music of Froebel's Mother Play*, S. E. Blow's edition ; *Songs and Games for Little Ones*, Walker and Jenks ; *Finger Plays for Nursery and Kinder-*

garten, Emilie Poulsson ; *Kindergarten Gift Plays*, M. E. Nuth ; *In the Child's World*, Emilie Poulsson ; *Child Garden* (Vols. III., VIII., and IX.) ; *Stories for Kindergarten and Primary Schools*, S. E. Wiltse ; *The Child World*, Gabriel Setoun ; the poetical works of A. and J. Taylor ; the poetical works of Thomas Gisborne.

CHAPTER VII

“ Each thing upward tends, by necessity decreed,
And a world's support depends on the shooting of a seed.”

I HAVE dealt in turn with a natural phenomenon, a spring flower, and an animal. In this chapter I shall show still further how our school gardening is related to the rest of the school curriculum by reproducing an example from the vegetable world.

The radish (*Raphanus sativus*) was the first vegetable of our own growing to come under our special consideration. It afforded material for thought and work part of one June and July and the following August and September.

B. II.—THE STANDPOINT WITH REGARD TO THE CHILDREN

“ And still with reverent hands we cull
Thy gifts each year renewed ;
The good is always beautiful,
The beautiful is good.”

WHITTIER.

We choose the radish as a subject for special consideration during this month (June) and part of the ensuing ones (July, August and September),

because we wish to lead the children to observe the wonderful way in which plants live and provide for their successors ; how many complete their life's work much more quickly than others ; and how, throughout, much of the lesser life on the plane of the plant world has to yield itself up for the sustenance and support of the life on a higher plane—that of the animals, and even of man himself.

The seeds sown in the school garden last March, and thenceforward so carefully watched and tended by the children, have now formed “ storehouses ” of food for their own later use if left undisturbed. The “ storehouses ” of such plants as the radish, carrot, etc., form, however, food for human beings, and few of them, therefore, are left in the ground, even in a school garden, unless for special purposes.

The radish will be the first vegetable produce yielded by our garden, and the ingathering of it will, therefore, be marked by a little radish feast, which will be shared by some of the children's parents and a few friends. In pulling the radishes care must be taken to leave some of them in the ground, that the children may see later on in the season what the plants do when left to complete their work, and what use they then may be to mankind as well as to their own species. If

left undisturbed the plant lives upon the store it has laid up, and raises its stem and flowers and seeds out of that abundance, and, having fulfilled its destiny and provided for its successor, yields



TRANSPLANTING CARROTS

“There are more things in heaven and earth,
Than are dreamt of in our philosophy.”

up its residue to Mother Earth for the renewal of the soil. The seed boxes form another article of food if gathered in the green state and pickled.

Thus all the way through there is a giving and taking between man and nature, and over all is the Great Planner and Providence, ever ready to give of His great bounty to those who will lovingly watch and tend the lesser receptacles of His wonderful Power.

“ The child, the seed, the grain of corn,
The acorn on the hill,
Each for some separate end is born
In season fit, and still
Each must in strength arise to work the Almighty Will.”

B. III.—PLAN OF WORK WITH THE CHILDREN

Sowing time recalled. The names of some of the seeds sown by the children in the vegetable garden. * The actual date when the radish seeds were sown. What they looked like. The beds in which they were sown. How they were sown (first mixed with some finely sifted earth, then scattered over the beds, these then lightly covered with the remainder of the sifted earth). The first appearance of the tiny plants above the ground ; their further growth. The thinning out of the radish beds, and why it had to be done.

The first class children refer to their calendars for dates, etc., marking any special facts in the life and growth of the radishes in the school garden. Visit to the radish beds in the garden. The familiar part of the plant known as the radish

visible in many cases. What this tells us. " Pulling " of some of the radishes by the owners of the beds. Washing of the " pulled " radishes.

THE RADISH

What part of the plant is the radish ? The pretty colour, the shape and size of the radishes from the school garden. Why we like radishes. As they are the first vegetables from our little garden it would be nice to mark the ingathering of them by a little radish feast to-morrow afternoon. Perhaps some of the children's parents and a few other friends would like to come and share the pleasure.

A radish (on a plate belonging to the babies' tea or dinner service) is provided for every two children to examine. At the end of the lesson the radishes are gathered up and put in a basin of cold water until they are needed again. The little plates are also collected, wiped, and put away.

Sending of a verbal invitation to some of the parents to the proposed feast through the children, and of the following note to a few other friends :—

THE " INVICTA " BOARD SCHOOL,
WESTCOMBE PARK, S.E.,
Infants' Department.

THE owners of the radish beds in the garden of the above school beg to say that the radishes

therein will be pulled to-morrow (Thursday) between 10 and 11 A.M.—weather permitting.

At 3.45 P.M. the children and staff of the school will assemble in the hall to partake of the radishes gathered in the morning.

During the earlier part of the afternoon a group of children will prepare the radishes and set the tables.

Friends who would like to share the pleasure will be cordially welcomed either morning or afternoon.

LUCY R. LATTER,
Headmistress.

June 11th, 1902.

(The foregoing is a copy of the actual letter sent to the friends.)

THE FEAST

Joy in “earth’s increase, foison plenty.”

Gratitude to the Giver of all good things.

The joy of sharing our gifts with others.

We are all glad that our little garden has yielded such nice produce, but, unless the Great Giver of all good things had touched the tiny seeds we put in the ground a little while ago, we should never have been able to have a little radish feast to-day.

What pleasure we shall be able to give our

visitors, for everyone will like to taste the first radishes grown in our little school garden ! We must prepare them very nicely, and then arrange them daintily in pretty dishes ready for the " feast."

Pulling of all the radishes ready for eating, the remainder left to continue their work.

Preparation of the pulled radishes and setting of the tables, etc., in the hall by the owners of the radish beds and a few comrades.

Reception and assembly of all the guests in the hall for the dainty feast at 3.45 p.m.

FURTHER CONSIDERATION OF THE RADISH

The thick fleshy part, the little hairy " threads " growing from it. The work of both. The threads or rootlets seize the earth like so many little fingers, and hold the plant firmly in place. They also get the food material from the ground. and then the thick fleshy part stores up a good deal of it for later use. When the children prepared the radishes for the feast they carefully took off the little rootlets, and we only ate the thick part. The hot taste recalled. In what part of the radish does it seem strongest ?

Radishes brought to school and distributed among the children for examination as on previous occasion. Some radishes peeled—the thickness of the skin, and the colour of the radish when the

skin has been removed, noticed ; also the taste of the radish without the skin.

The " crown " of the radish and the cluster of leaves springing therefrom.

The colour, size, and shape of these leaves. The slightly notched and crinkled edges of the early ones. The surface of the leaves—smooth or otherwise ? The veining. Sometimes the young leaves of the radish are made into a salad and eaten.

A radish with the leaves still at the top provided, as on other occasions, for every two children to examine. The leaves removed and made into a simple salad, which the children partake of at the end of the lesson. The remainder of the radish is also eaten.

THE RADISH PLANT AS SEEN GROWING IN THE GARDEN IN JUNE AND JULY

The stem gradually developing. The leaves getting more toothed, the teeth getting wider and less pointed, and more in number.

Visit to the radish beds in the garden. The height of some of the plants left there found out by individual children. Other changes on the plants noticed.

Fresh sowing of radish seeds for a later crop.

AUGUST AND SEPTEMBER WORK

THE RADISH PLANT AS SEEN GROWING IN THE
GARDEN IN AUGUST AND SEPTEMBER

Thanks to its rich store of food the plant has been able to grow very tall, and send out many leaves and pretty flowers. General appearance of the plant.

The height now of some of the plants left in the garden found out by individual children. The number of flower buds—of flowers, on a single plant counted.

THE FLOWER BUD

A number of little buds on a stem, each bud having a little stalk of its own. How the buds are arranged on the stem. Their shape, colour, and size. How the flowers are packed within.

A few flower buds gathered from the garden and taken into school to be examined, and then kept there in water to see what may happen.¹

THE FULL-BLOWN FLOWER

The pretty colour of the radish flowers. Their size. The way they hold themselves. The outer leaves, their number and colour. What we find

¹ The children now keep small growing plants and gathered specimens in pots and little bottles or tins arranged on their *own* desks, as well as on the shelves and tables in the room.

when we move our fingers gently round the bottom of our flower. * What these little swellings mean.

The inner flower leaves arranged in the form of a pretty cross. * The relative position of the outer flower leaves to the inner ones. Why the flower leaves are arranged so that there is no space left unprotected between them. There must be something very precious inside which needs to be guarded so carefully. What we notice when we look inside a radish flower. The "dust-spikes" (or stamens). Their number. There is something very curious about these "dust-spikes." Two seem shorter than the others. Can the children think why this is?

The slender column (or pistil) in the middle of the flower ; its sticky head.

Some full-blown flowers gathered from the garden and taken into school for examination. At the end of the lesson these are collected and carefully arranged in a glass of fresh water. Any insect "visitors" to the plants noticed by the children when in the garden.

THE MORE MATURED FOLIAGE

The leaves of the radish plant are much coarser and more hairy than when we looked at them a little while ago. They are also now almost divided

into leaflets at the bottom. Each portion, however, is still connected by a narrow strip of the leaf. The way the leaves grow on the stem. The stem much more developed and getting woody in character.

Some leaves gathered from the garden by individual children and taken into school for examination. Other children tie up the straggling radish plants. In doing this they find that the stems and leaves sting their hands almost like a nettle. The cause of this found out.

The foliage taken into school is put into a glass of fresh water at the end of the lesson.

THE FRUIT OF THE RADISH

Many of the pretty flowers left on our radish plants have disappeared, and in their place a curious green thing has come. Its shape and size. A thick part which "bulges" out a great deal, and a long tapering end. The name given to this latter part (the "beak").

These curious green things are the treasure boxes of the radish plant. By-and-by, when the plants open their treasure boxes, we shall be able to see what is inside.

A few pods gathered from the garden and taken into the school for examination. The children find out the length of the pod as a whole, the length of the beak, etc.

ECONOMIC VALUE OF THE FRUIT OF THE RADISH

When carefully prepared the young radish pods make a nice pickle. As we have so many pods in our garden we will see if we can pickle some of them.

Preparation for and pickling of radish pods.

A number of green pods are gathered from the garden by individual children—the owners of the radish beds and a few comrades. The while two or more children go out with a teacher to buy given quantities of the things necessary for making the pickle (salt, white or brown vinegar, mace, ginger, long pepper, and horse-radish). The pods are put into salt water for a night. Boiling and re-boiling of the salt and water, and pouring and re-pouring of the same over the pods till they are green. Final draining of pods and putting of them into the pickle prepared from the above ingredients. Tying down of glass jars, pasting on of labels, prepared by the older children beforehand. Putting away of the jars of pickles in a dry place until required for eating.

THE RIPENED FRUIT, OR SEED BOX, OF THE RADISH

The appearance now of the plant's treasure box. What has happened to some of the "boxes." The curious way in which the plant opens its treasure box (transversely, etc.). The number of divisions in the box. The "treasures" beautiful little dark

brown seeds. The number in some of the boxes. The little covering which each little seed seems to have had.

Ripened pods gathered from the garden and examined in school. The seeds carefully shaken out into little paper boxes made beforehand by the older children. Examination of the seeds and also of the empty pods.

Seeds placed in shallow boxes and left in the sun to dry. Paper bags made and labelled by the children. The dried seeds put into these bags, which are then fastened down and stored away until sowing time comes again.

THE SPENT PLANT

The general appearance now of the radish plant. The stem and root. The hollowness of the stem noticed. The change in the radish itself—it is no longer thick and fleshy, and no longer nice to eat. What has become of all the food which the plant stored up in it a little while ago ?

What a wonderful life the plant has lived, and how beautifully everything has been arranged that every step might lead to something more beautiful and useful ! How tenderly the plant prepared for and took care of its baby seeds until they were strong enough to wander into the world ! The plant has still some work to do. It will go

back to Mother Earth, and help to make the soil rich for other little seeds.

Pulling up of the radish plants which have done their work as such in the garden. The children then examine the stem and root. The plants are then removed to some suitable place, where they may help to form mould for future use.

WORK IN THE GARDEN

June and July

Watering, weeding, tidying of beds (groundsel and chickweed saved for pet canaries).

Protecting of plants from natural pests—watering the broad beans with soapy water to rid them of the blackfly (aphis), and the beds with paraffin water to free the soil of destructive grubs ; putting down of soot and salt around plants visited by slugs, lime for protection of plants from other animals, such as ants.

Thinning out of the following and other beds as may be necessary :—radish, lettuce, cabbage, carrot, mignonette, helichrysum, etc.

Staking of lilies, stringing of runner beans, staking of peas, pulling of radishes.

August and September

Weeding of beds, tidying of beds and borders.
Gathering in of beans.

Nailing up of trailing ivy sprays, lilac, and jasmine.

Propping up of sunflowers, dahlias.

Clearing of the radish beds.

Ingathering of any seeds which are ripe in other beds—for example, flax, clarkia, larkspur, convolvulus, alyssum, eschscholtzia.

Staking the chrysanthemums.

Plants in various beds cleared of caterpillars likely to injure them. Caterpillars taken into school to be taken care of and watched there during the ensuing months.

B. IV.—THE GIFTS, OCCUPATIONS, GAMES, STORIES, PICTURES, RECITATIONS, AND HYMNS
USED IN CONNECTION

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
DRAWING (Free and other).	Radishes of various kinds, bunch of radishes, garden basket, bowl, dish, knife, plate, salt-cellar, spoon, early leaves, full-grown leaves, head of flowers, flower-vase, fruit on a stem, glass jar, saucepan, plan of the vegetable garden, position of the radish indicated thereon, front of store-cup-board.	Radishes of various kinds, bunch of radishes, watering-can, garden - basket, bowl, knife, dish, plate, salt-cellar, spoon, early leaves, full-grown leaves, head of flowers, flower-vase, fruit on a stem, glass jar, saucepan, front of store-cup-board, plan of the radish beds.	Radishes of various kinds, watering-can, garden - basket, bowl, knife, dish, plate, salt-cellar, spoon, a single early leaf, a single full-grown single flower, one single flowers, shallow flower-bowl, single pods, glass jar, saucepan, front view of fireplace.	Radishes of various kinds, watering-can, garden - basket, bowl, knife, dish, plate, pods, glass jar, saucepan, front view of table.	Radishes of various kinds, garden - basket, bowl, knife, vase, pods, glass jar, saucepan.	Radishes of various kinds, garden - basket, bowl, knife, vase, pods, glass jar, saucepan.
BRUSHWORK AND COLOURING.	Radishes of various kinds, leaves, flower-buds, flowers, fruit.	Radishes of various kinds, leaves, flowers, fruit.	Radishes of various kinds, a leaf, single pods.	Radishes of various kinds, a leaf, a pod.		
MODELLING.	Radishes on a dish, plate, flowers, leaves, vase, pods, saucepan, plan of the kitchen garden.	Radishes of various kinds, basket, dish, bowl, salt-cellar, leaf, vase, pods.				
PAPER FOLDING.	Basket, dish, salt-cellar, double flower-vase, table, chair, boxes for seeds, bags for storing of seeds, labels for glass jars (folding and cutting) (oblong and square-shaped paper).	Basket, salt-cellar, vase, flower, table-cloth, seats, boxes for seeds, bags for storing of seeds (square-shaped paper).	Table-cloth, basket, envelope and folded "note-paper," front of store-cup-board, vase, boxes for seeds (square shaped paper).			

GIFT IV. (Classes II. & III.). GIFT III. (Classes IV. & V.). TABLETS † (Squares).	Garden, well, basket, table and seats, cupboard, plan of vegetable garden.	Garden, well, basket, table and seats, shop, cupboard, fireplace, plan of garden.	Garden, wall, garden, pump, kitchen-table, chairs, fireplace, cupboard, salt-cellar. † Objects made with Gift III. reproduced on the flat.	Garden walls, garden, pump, kitchen-table, and chairs, big seat, fireplace, cupboard.	Garden fence, long radishes, basin, saucepan, fireplace, chair, table.	Garden fence, long radish, basin, saucepan, chair, table, basket, vase.	Mats to go under the dishes, and vases arranged for the feast; wind "dolls" for the garden to keep the birds from the young plants; little brooms for the sand garden.
RINGS AND STICKS (Class III.). STICKS OR LATHS (Classes IV., V., VI.).		Radishes, basket, bowl, knife, spoon, dish, plan of the flower, vase, saucepan, fireplace, glass jar, watering-can.	Long radishes, basin, bowl, front of table, saucepan, fireplace, front of stove - cupboard, watering-can.	Garden fence, long radishes, basin, saucepan, fireplace, chair, table.	Garden fence, long radishes, basin, saucepan, fireplace, chair, table.	Garden fence, long radish, basin, saucepan, chair, table, basket, vase.	Exercises with the cylinder (roller, etc., for the sand garden). Exercises with the cube (watering-can, etc., for the sand garden).
JOINTED LATH (Class V.). PRAYING (Class VI.).							Exercises with the cylinder (roller, etc., for the sand garden). Exercises with the cube (watering-can, etc., for the sand garden).
GIFT II.							A kitchen garden (little green, red, and white beads added to some of the beds to indicate first the leaves appearing above the ground, then the white or red radishes). A flower garden (beds bordered with shells or beads, or with beads "threaded" on little sticks).
SANDWORK.							A kitchen garden (little green, red, and white beads added to some of the beds to indicate first the leaves appearing above the ground, then the white or red radishes). A flower garden (beds bordered with shells or beads, or with beads "threaded" on little sticks).

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
THREAD LAYING.					Radishes of various kinds, basket, bowl, knife, vase, glass jar, saucepan.	Radishes of various kinds, basket, bowl, vase, glass jar, saucepan.
BEAD THREADING.						Beads "threaded" on little sticks, etc., for fence and border for the sand gardens.
GAMES.	Summer Joy. Shower and Flower. Summer.	The Sunbeams (Now what shall I send to the Earth). Summer Days. The Song of the Bee.	'Tis Raining. Thanksgiving Song. The Bees' Market.	Summer Song. Straight and Tall in the Garden Bed. Come, Little Leaves.	Rain Song. The Sunshine's Song. Happy Summer. The Garden. Taste Song. Flower Song.	Pitter, Patter, here they come. The Little Gardener (Come, Children, with me to the garden). The Wheelbarrow. Taste Song. Smelling Song. The Flower-bed. The Greeting.
STORIES.	Inside the Garden Gate. Treasure-boxes.	A June Morning. Clytie.	The Dewdrops and the Blossom. Do what You can.	The Story of the Radish Seed.	The Sunbeams.	The Sunbeam Fairies.
PICTURES.	Summer (Henri Riviere). The Gleaners (Millot).	Happy Days (Fred Morgan). (Seasons : Fitzroy).	Pictures of the Month (Fitzroy).	The Working Man's Garden (W. & A. K. Johnston).	The Costermonger (W. & A. K. Johnston).	The Little Gardener (Froebel). The Garden Gate (Froebel).
RECITATIONS.	After the Rain. The Gardener.	The Sunbeams. September.	Sunshine. World is filled with Sound.	Radishes. Ding - Dong (Sing a Song of Summer).		
HYMNS.	Blessings on Effort. Thanksgiving Song.	As in I.	As in I.	As in I.	As in I.	As in I.

B. V.—LIST OF BOOKS REFERRED TO FOR
INFORMATION AND READING

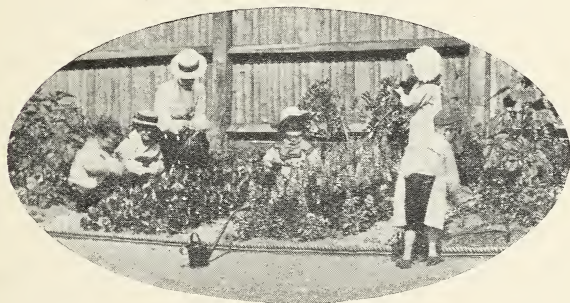
First Studies of Plant Life, G. F. Atkinson, Ph.B.; *Chapters in Modern Botany*, Professor Geddes; *Botany, an Elementary Text-book for Schools*, L. H. Bailey; *Plants and their Children*, Mrs W. S. Dana; *Structural Botany*, Asa Gray; *Seedlings*, Lord Avebury; *Flowers, their Origin, Perfumes, and Colours*, J. E. Taylor, F.G.S., F.L.S.; *Proserpina*, Ruskin; *British Flora*, Bentham and Hooker; *Encyclopædia*, Chambers; *Universal Cyclopædia*, Johnson; *An Encyclopædia of Gardening*, T. W. Sanders, F.L.S., F.R.H.S.; *Handbook on Gardening*, published by W. & R. Chambers, Edinburgh; *How to make School Gardens*, H. D. Hemenway; *School Gardening*, W. E. Watkins and Arthur Sowman; *Schul Naturgeschichte: Botanik*, Leunis; *Illustriertes Gartenbuch*, Hüttig; *Lettres sur la Botanique* (2), J. J. Rousseau; *Die Metamorphose der Planzen*, Goethe; *The Beauties of Nature*, Lord Avebury; *Life, its Nature, Varieties, and Phenomena*, L. H. Grindon; *A Vision of Sir Launfal*, Lowell; *Al Fresco*, Lowell; *A Summer Ramble*, Bryant; *Thank God for Summer*, Eliza

Cook ; *Lady June*, Eliza Cook ; *September*, Wordsworth ; *The Fruit Gift*, Whittier.

LIST OF BOOKS FROM WHICH THE GAMES, STORIES,
AND RECITATIONS HAVE BEEN SELECTED

Songs for Little Children (Vols. I. and II.), E. Smith ; *Songs, Games, and Rhymes for the Nursery, Kindergarten, and Primary School*, E. L. Hailmann ; *Kindergarten Chimes*, K. D. Wiggin ; *Song Stories for the Kindergarten*, M. J. Hill ; *Songs and Games for Little Ones*, Walker and Jenks ; *Fifty Children's Songs*, Carl Reinecke ; *Little Songs for Little Voices* (Book I.), Alfred Scott Gatty ; *Songs and Music of Froebel's Mother Play*, S. E. Blow's edition ; *Holiday Songs, and Everyday Songs and Games*, Emilie Poulsson ; *Finger Plays for Nursery and Kindergarten*, Emilie Poulsson ; *The Child's Song and Game Book* (Part I.), H. Keatley Moore, Mus. Bac., B.A ; *Stories in Song for Kindergarten, Home, and School*, Emerson and Brown ; *Stories Mother Nature told*, J. Andrews ; *In the Child's World*, Emilie Poulsson ; *Philadelphia Kindergarten Stories*, L. van Kirk and M. G. Clark ; *Mother Stories*, Maud Lindsay ; *Child Garden* (Vols. III., VIII., and IX.) ; *A Child's Garden of Verses*, R. L. Stevenson ; *Little Folk's Land*,

H. G. Groser ; *Flowers I Bring and Songs I Sing*,
Edith Nesbit ; *Poetical Works*, M. Howitt ; *Rhymes
and Finger Plays*, selected or written by Lucy R.
Latter for the "Everyday Life Series of Pictures,"
published by W. & A. K. Johnston.



"The glory and the freshness of a dream."

CHAPTER VIII

“ He breaks no thread His hand has spun.”

IN this chapter I purpose showing how the insect life of a garden may be dealt with in school, and what a vast store it provides for the rest of the school work to draw upon. It will then, perhaps, be seen that the difficulty which such a subject often seems to present is more apparent than real.

The children continually meet with insects of all kinds when working in the garden, and a great desire is awakened in them to know something about the delicate little creatures flitting here, there, and everywhere, as is evinced by their eager questions and expressions of wonderment. Insect life is a subject, therefore, which involuntarily presents itself there for consideration. It is simply a question of selecting to the best advantage from the vast store of material at our service.

The large white cabbage butterfly (*Pieris brassica*) was the first insect visitor to our garden to come under our special consideration. It

afforded material for thought and work one September and October and part of the following May.

B. II.—THE STANDPOINT WITH REGARD TO THE
CHILDREN

“ Wending

Its way from flower to flower,
Like a free and happy spirit.”

In June and July the cabbage (*Brassica oleracea capitata*) occupied our special attention. During that time the children noticed some of the graceful visitors to the cabbages in the school garden, amongst others the large white cabbage butterfly (*Pieris brassica*). As this little creature seems particularly attractive to the children, it naturally suggests itself as the subject for our special consideration the ensuing months. Our selection of the subject is further determined by the fact that the cabbage butterfly is a frequent visitor to our garden, broods or generations of it appearing in the spring as well as in the autumn. Its graceful form and delicate colour render it peculiarly attractive, and its life-history is as fascinating as a fairy tale; nay, the gradual change of outward form as the inner life develops uninterruptedly is one of Nature's most beautiful emblems.

There is no break in the story. The egg yields the caterpillar, which stores up strength and substance in the form of germ cells for the benefit of the chrysalis, in which all the powers, organs, and form of the butterfly are essentially and actually developed. The chrysalis finally casts its skin and unfolds parts previously concealed and immature ; first the limbs, by-and-by the wings opening more and more, till the idea of the perfect insect is attained. Thus are butterflies true and beautiful “ emblems of our own great resurrection.”

Furthermore, in following the life of a butterfly, we are again brought face to face with one of the greatest truths in the Philosophy of Nature—namely, that “ all living things exist, and feed, and grow, and gather strength, in order that they may perpetuate their race.” The glory of God consists in the maintenance and increasing multiplication of receptacles of His life.

Another truth is also exemplified for us in the life of the butterfly—namely, that the continual purpose of life is “ to obtain a point of departure for renewed progress, pushing out of the way whatever may obstruct,” so that Reproduction and Death are but the struggle of Life with itself to attain a higher form.

These are truths of which the child can get but

a glimmering now in his partnership with Nature ; but who shall say that later on they may not reverberate in him with ever-increasing strength and beauty, and make the purpose of life seem one grand, vast whole, having its beginning and end in the Divine Love and Wisdom ?

“ Life’s more than breath and the quick round of blood ;
 ’Tis a great spirit and a busy heart.
 We live in deeds, not years ; in thoughts, not breaths ;
 In feelings, not in figures on a dial.
 We should count time by heart-throbs. He most lives
 Who thinks most, feels the noblest, acts the best.”

B. III.—PLAN OF WORK WITH THE CHILDREN

Insect visitors to the garden during the past months recalled. The kind of day on which they seemed to like to come out. The beds they seemed mostly to visit. Perhaps there may be some insect visitors in our garden to-day as it is so bright and fine.

Visit to the garden. Some butterflies found flitting about among the flowers. A pretty creature with red and black markings on its body noticed on a sunflower, several whitish-looking creatures on the cabbage beds. Two of these latter butterflies seem very busy. One is evidently trying to find a nice resting-place, the other is mounting guard over her. See, she has settled on a cabbage leaf ! How strange that she has chosen the under side of it ! Something wonderful

must be going to happen. Perhaps we shall be able to find out, by-and-by, what the butterfly does when she settles thus upon a cabbage leaf. A small cluster of tiny golden yellow eggs found later and taken into school (on the leaf on which they were laid), and placed in a larva house to be taken care of and watched from day to day.

THE BUTTERFLY'S EGGS

The way in which they have been laid upon the leaf. Their beautiful colour. Their size and number (few or many). The loving care the mother butterfly took to secure a place for them where they might be protected against rain and the hot rays of the sun, as well as hidden from the eyes of anybody who might hurt them when she had to leave them. By-and-by we may perhaps be able to find out why she chose a cabbage leaf for her babies' cradle. Meanwhile we must take great care of the little creatures.

Examination of the eggs in the larva house. Changes in them noticed from day to day.

Other little creatures have been visiting our garden. How do we know this? How is it we cannot always see these little creatures at once?

Another visit to the garden. No butterflies seem about now. The children find, however, that some other little creatures have been in the garden. The cabbages in one bed are all spoilt.

The leaves are full of holes. In some cases only stalks and ribs remain. Somebody has been feeding on our cabbage plants. Individual



“There’s never a leaf nor a blade too mean
To be some happy creature’s palace,”

*children search among them, and after a time
find some small caterpillars. Where?*

*Caterpillars taken into school to be kept and
watched there a little while.¹*

¹ Whilst caterpillars of various kinds were brought in from the garden and elsewhere, those of the large white cabbage butterfly were the subject of our special consideration in this plan of work.

Some empty (jam or other) glass jars fetched and cleaned by individual children. A little moist earth, as well as plenty of food (kind?), put in each. Caterpillars then carefully put in the temporary homes thus prepared for them, and a piece of white leno fastened over the top of each glass jar to prevent the little creatures from straying away.

(The children tend the creatures throughout, taking special care that their temporary homes are always clean and nice, and dusty leno covers replaced by new ones from time to time.)

THE YOUNG LARVÆ, AND THE CATERPILLARS OR OLDER LARVÆ, OF THE CABBAGE BUTTERFLY

Something very strange has been happening to our butterfly eggs. Some curious little grubs have come in the place of the pretty little golden eggs. They make us think of some of our caterpillars.

Examination of the larva house. The butterfly eggs found to be all hatched. The emerged larvæ are compared with some of the caterpillars brought in later from the garden, and found to be like them.

WHAT THE CATERPILLARS DO. * HOW THEY FEED

The kind of food they like. * Their strong jaws, how they move. The quantity of food the creatures eat.

The caterpillars in the larva house and the glass jars watched. The riddled condition of the leaves

after even one day's feeding noticed. Fresh cabbage leaves given to the creatures, and the way they eat carefully noticed. (The stretching of the body. The advancing of the head. The applying of the mouth to the margin or some other portion of the leaf. The regular way in which the creature eats away the leaf, always starting from the farthest point which can be reached by the advancement of the head, and then gradually moving round to the nearest point, when it again extends its mouth to the point whence it began to eat, and repeats the same process, a little "slice" being devoured each time. The quick and peculiar movement of the jaws observed.) The children can now, perhaps, tell why the mother butterfly chose a cabbage leaf for her babies' cradle.

HOW THE CATERPILLAR MOVES

* HOW IT BREATHESES

Unless disturbed it moves lazily, and does not make long journeys. It climbs up the stalks of plants.

The arching of the body in moving.

Individual caterpillars watched, and their movements described. (One caterpillar for every two children will suffice. Each of the specimens to be distributed among the class in this and subsequent lessons must, for the sake of the creature, be put in a sand or modelling tray, with a little cabbage leaf.)

The children notice the breathing holes. They find out their number.

THE FORM, COVERING, AND COLOUR, ETC., OF THE
CATERPILLAR

The cylindrical shape of the body. The number of segments. The soft covering. Its pretty colour — bluish-green with black dots, and a yellow stripe on the back and on each side.

Individual caterpillars distributed for examination as before. The children pass their finger gently over the body and notice its softness and colour. They count the segments. The children can perhaps now say why it was so difficult to find these caterpillars on the cabbages in our garden.

THE LEGS OF THE CATERPILLAR

Their number, and where placed. The difference between the thoracic legs and the pro-legs ; the need for the latter.

Individual caterpillars distributed for examination, as before. The number of legs counted, and the segments on which they are placed described.

The children let the little creatures move up and down and along their fingers. Difference in the legs noticed. Some of the "legs" (the hind or false ones) seem to help the little creatures to come down "hill" without tipping over. They also help them to creep along the under surface of leaves, etc. The caterpillars are replaced in the glass jars and larva house, and then watched there. The children notice them moving up and down the glass, and over the lino covering.

THE CATERPILLAR'S HEAD

The shape and colour. * The mouth and its wonderful arrangement for spinning silken threads. The eyes, their number and kind. Where placed on the head. (A good drawing useful here.)

Individual caterpillars examined as before.

THE GROWTH OF THE CATERPILLAR

The caterpillar grows so rapidly that its "coat" often becomes too tight for it, and it is obliged to cast it off and get a new one. It has to get quite a number of new "coats" while it is growing.

The children examine the glass jars in which the caterpillars are being kept in school. They find some cast-off coats. Particular caterpillars are now watched from day to day to see how often they change their coats before they are full grown. The cast-off coats are saved.

Twigs are now placed in the caterpillars' temporary homes.

THE WAY THE CATERPILLAR PREPARES FOR ITS

LONG SLEEP

Something curious seems to be happening to some of our caterpillars. They are restless. They are getting a different colour, and losing their appetite. Some of them seem to be trying to fasten themselves to the top of the glass of their

temporary home by means of strong silky threads which they are spinning. Others are trying to secure themselves in like manner to some of the twigs the children put in the glass jars the other day. These little caterpillars evidently now want to find a place for themselves above the earth. Can the children think why they should do this? What would they do if they were out in the garden and wanted to find a secure place for themselves there above the ground?

Examination of the full-grown caterpillars. The children watch them fixing themselves to the top of the glass jars and the larva house, as well as to some of the twigs previously arranged therein, as often as possible. They notice that when the caterpillars have made themselves quite secure they throw off another coat, and go to sleep.

THE APPEARANCE OF THE SLEEPING CATERPILLAR;
THE CHRYSALIS (OR PUPA) AS IT IS NOW CALLED

Chrysalides examined very carefully. Their beautiful shape and colour noticed. (A small hand magnifying-glass may be used here with advantage.) How securely the little creatures seem suspended in the glass jars and the larva house by the fine strong silk threads which they spun round themselves when preparing for their long sleep! If they were out of doors they would often be rocked to and fro by the wind.

* THE MEANING OF THIS CHRYSALIS SLEEP

A preparation for a higher and more beautiful form of life.

The children look after the chrysalides all the winter. They continue to keep the temporary homes of the little creatures as nice as possible. They put fresh covers of lino when the old ones are dirty. They clean the inner as well as the outer side of the "walls" of the "homes," and if necessary renew the little notices which tell the names of the inhabitants, and when they came to live thus in the school.

This must all be done very carefully, in order that the chrysalides may not be disturbed whilst they are sleeping, and, may be, dreaming—"a wonderful dream of delight."

THE CHRYSALIDES SHOW SIGNS OF WAKING UP

"Say not Good-night—but in some brighter clime
Bid me Good-morning."

As the bright days of spring approach some of the chrysalides look as if they would soon wake up. They are a little restless; then they seem to get quieter, and become a little different in colour. The little creatures within the "horny" cases are now visible.

The children watch the school chrysalides very closely now. They observe them making curious jerky movements from time to time, with what

seems to be the tail end of their body. Later these movements seem to cease, and the chrysalides get somewhat different in colour.

Keener interest than ever is aroused in the children.

THE AWAKENING

At last a wonderful thing happens. The sleepy little creatures wake up; and are now quite different. They are now lovely butterflies. Note their delicate form and graceful movements, their appearance when they emerge from the chrysalis case.

May 1st.—In one of the glass jars in the babies' room a butterfly found to have emerged from its chrysalis case. A prettier and more comfortable home is given to it. The little creature is carefully transferred on a twig to the larva house in the hall, where it finds a friend—another butterfly, which emerged from its chrysalis case a few days earlier.

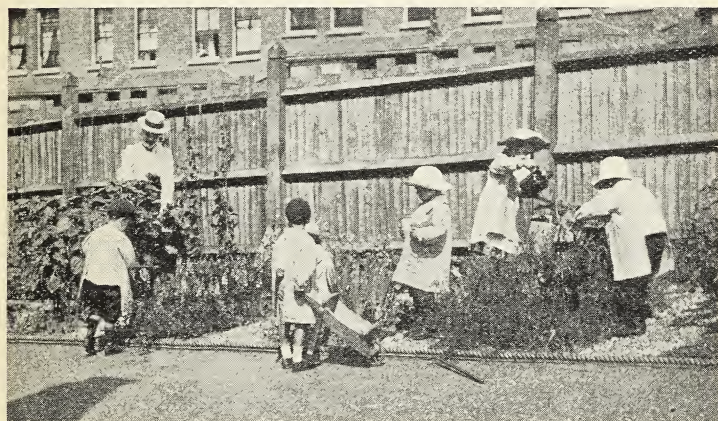
Feeding of the little creatures. Fresh flowers and moistened sugar put for them in the larva house each morning. The older children record the date of the awakening of each butterfly in school. They watch in the garden for the appearance of any butterflies there, and record the date of the same.

Note.—As the weather becomes warmer other butterflies emerge from their chrysalis case, and are similarly cared for.

THE EMPTY CHRYSALIS CASE

It is no longer as beautiful as when tenanted.
Its horny character. The way in which it split
to let the butterfly out.

*The children collect the empty cases from the
jars, and examine them.*



"Soft visions of serene delight,"

THE BUTTERFLY. WHAT IT DOES. WHAT IT FEEDS
ON. HOW IT FEEDS. ITS WONDERFUL TONGUE

The cabbage butterfly feeds solely on sub-
stances of a liquid nature, which it sucks up through
its wonderful tongue—a long and slender tube,

which is coiled like the spring of a watch to protect it from injury when not in use.

(On this occasion the school butterflies are fed during the lesson, in order that the children may have the special opportunity of seeing the tongue in use.)

Individual children put a lump of moistened sugar, or a little honey diluted with water, on a flower near a butterfly in the larva house, and then watch what happens. They see how the butterfly uncoils its tongue, and inserts the end in the wet sugar, or in the honey. They also see how it coils its tongue up again when it has had enough food. The children recall the pretty red and black butterfly they saw sipping nectar from a flower in the garden the previous autumn. They watch other butterfly visitors now, and note what flowers they seem to frequent in the garden.

THE FORM, COVERING, AND COLOUR OF THE LARGE WHITE CABBAGE BUTTERFLY

The ringed body, somewhat cylindrical in form and tapering a little towards the end. Length about three-quarters of an inch, and not extending beyond the extreme margin of the hind wings. The downy covering. Its colour.

The chief parts of the body. (A good drawing useful here.)

The children examine the butterflies in the larva house.

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THE BUTTERFLY'S HEAD

Its shape and (relative) size. The feelers, their use to the butterfly. Its wonderful eyes; they never move; and yet the butterfly is able to see very well.

The mouth, the tongue or sucking tube.

The children examine the butterflies in the larva house, as before.

ORGANS OF LOCOMOTION. THE WINGS OF THE LARGE WHITE CABBAGE BUTTERFLY

Their number and shape. The part of the body to which they are attached. Their covering. Their powdered appearance.

Examination of the butterflies in the larva house.

A magnifying glass may be used here with advantage.

THE COLOUR OF THE WINGS AND THE BEAUTIFUL MARKINGS ON THEM

The markings help us to know the mother butterfly from the father butterfly. The wings depend upon their "powdery" covering (the scales) for their lovely colour.

* How the colouring of the butterfly affects the daily life and welfare of the creature.

The children examine the butterflies in the larva house, and distinguish the mother butterfly from the father butterfly.

They watch the butterflies in the garden, and find it sometimes difficult to tell a butterfly from the flower on which it is resting, because of the similarity of colour between the under part of the butterfly's body and wings and that of the flower.

THE LEGS OF THE BUTTERFLY

The part of the body to which they are attached. Their number. Downy near the body. Very weak, and only used when resting or eating.

*The children watch the school butterflies. * They notice how the little creatures place their legs when standing.*

THE HABITS OF THE BUTTERFLY

The butterfly loves the sunshine, and on warm bright days flits about the flowers "like a free and happy spirit," adding to the beauty of the world. It generally goes to rest at or before sunset. In dull and rainy weather it flies but little, hiding itself in sheltered places. * The character of its flight. The position of the wings in flight and at rest. The special name of the butterflies the children have been keeping in school.

The butterflies developed in school are set free in the garden, and watched on the flowers in the sun-

shine. Any eggs left in their old temporary homes are carefully preserved and watched.

WORK IN THE GARDEN

September and October

Cabbage and other beds cleared of caterpillars.

Caterpillars taken into school to be taken care of, and watched there, during the ensuing months.

Gathering in of ripened seeds.

Taking up of spent plants.

Collecting of dead leaves for leaf mould.

Preparing of beds for the setting of bulbs later on.

Putting of artificial manure on the beds, and adding a little fresh earth.

May

Tying up the straggling foliage of bulbous plants.

Plaiting the leaves of spent crocuses and turning their ends into the soil.

Watering of plants.

Weeding of beds.

Nailing up strings on the fence for the runner beans.

Cleansing of the ivy on the fence.

Plants and beds watched and protected from troublesome animal visitors—such as sparrows, aphids, ants, slugs, and caterpillars.

Fresh gravel laid on the paths.

B. IV.—THE GIFTS, OCCUPATIONS, GAMES, STORIES, PICTURES, RECITATIONS, AND HYMNS
USED IN CONNECTION

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
DRAWING (Free and other).	Cabbage leaf with cluster of cabbage butterfly eggs upon it. Caterpillar upon a cabbage leaf. Riddled cabbage leaves. Plan of vegetable garden (position of cabbage beds indicated thereon). Glass jar. Front of larva house. Chrysalis on a twig. Butterfly in flight; at rest on a cabbage flower. Other flowers visited by the cabbage butterfly. Plan of the flower-garden. Honey-pot, sugar-bowl.	Cabbage leaf with cluster of cabbage butterfly eggs upon it. Caterpillar upon a cabbage leaf. Riddled cabbage leaves. Plan of the cabbage beds. Glass jar. Front of larva house. Chrysalis on a twig. Butterfly in flight. Butterfly at rest on a cabbage flower. Other flowers visited by the cabbage butterfly. Plan of the flower-beds held by the class. Honey-pot, sugar-bowl.	Cabbage leaf with cluster of cabbage butterfly eggs upon it. Caterpillar upon a cabbage leaf. Riddled cabbage leaves. Glass jar. Front of larva house. A twig. Butterfly in flight. Butterfly at rest on a cabbage flower. Other flowers visited by the cabbage butterfly. Honey-pot, sugar-bowl.	Cabbage leaf with cluster of cabbage butterfly eggs upon it. Caterpillar upon a cabbage leaf. Riddled cabbage leaves. Glass jar. Front of larva house. Twig. Butterfly in flight. Butterfly at rest on a cabbage flower. Honey-pot, sugar-bowl.	Caterpillar. Caterpillar on a cabbage leaf. Riddled cabbage leaves. Glass jar. Twig. Butterfly in flight. Butterfly at rest on a cabbage flower. Honey-pot, sugar-jar.	Caterpillar. Caterpillar on a cabbage leaf. Riddled cabbage leaves. Twig. Butterfly in flight. Honey-pot, sugar-jar.
BRUSHWORK AND COLOURING	Eggs on a cabbage leaf. Caterpillar on a cabbage leaf. Riddled cabbage leaf. Chrysalis on a twig. Butterfly in flight. The cabbage flower. Other flowers visited by the cabbage butterfly. Butterfly at rest on a cabbage flower.	Eggs on a cabbage leaf. Caterpillar on a cabbage leaf. Riddled cabbage leaf. Chrysalis on a twig. Butterfly in flight. The cabbage flower. Other flowers visited by the cabbage butterfly. Butterfly at rest on a cabbage flower.	Eggs on a cabbage leaf. Caterpillar on a cabbage leaf. Riddled cabbage leaf. Chrysalis on a twig. Butterfly in flight. Cabbage flower.	Caterpillar. Riddled cabbage leaf. Twig. Butterfly in flight. Cabbage flower.		

MODELLING	Cabbage leaf with eggs upon it. Caterpillar upon a cabbage leaf. Riddled cabbage leaf. Butterfly in flight. Butterfly at rest on a twig. Honey-pot, sugar-bowl.	Box, vase, flower, butterfly, sugar-tongs (square-shaped paper).	Window box, duster, flower-vase, sugar-bowl, sugar-tongs (square-shaped paper).				
PAPER FOLDING.	Box, double vase, flower, butterfly, honey-pot, sugar-bowl (square and oblong-shaped papers).	Box, vase, flower, butterfly, sugar-tongs (square-shaped paper).	Garden fence, garden box, window honey-pot, sugar-bowl.	Garden walls, garden, gateway, box, window, sugar-bowl. + Objects made with Gift III. reproduced on the flat.	Garden walls, garden, gateway, box, window, sugar-bowl.		
GIFT IV. (Classes II. & III.). GIFT III. (Classes IV. & V.). TABLETS + (Squares).		Plan of the school-garden (collective work). Garden fence, gateway, garden, box, window, honey-pot, sugar-bowl.		Glass jar, front of larva house, twig, butterfly, honey-pot, window.	Twig, butterfly, front of larva house, window, garden fence.	Twig, butterfly, front of larva house, window, garden fence.	
RINGS AND STICKS (Class III). STICKS OR LATHS (Classes IV., V., VI.).			Glass jar, front of larva house, twig, flower, butterfly, honey-pot, spoon, sugar-bowl, sugar-tongs, window.		Window, front of box, twig, butterfly, honey-pot, garden fence.	Covers for glass jars, and larva house, mats to go under the glass jars, little brooms to sweep out the boxes in which various kinds of caterpillars are kept.	Exercises with the cylinder (roller for the sand gardens and parks). Exercises with the cube (watering-can, etc., for the sand gardens and parks).
JOINTED LATH (Class V.). FRAYING (Class VI.).							
GIFT II.							

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
SANDWORK.					Garden and park in autumn (bead caterpillars added). Garden and park in spring (little paper butterflies added).	Garden and park in autumn (bead caterpillars added). Garden and park in spring (little paper butterflies added).
THREAD LAYING.					Leaf, caterpillar, jar, chrysalis, twig, butterfly, flower, sugar-bowl, honey-pot, spoon, sugar-tongs.	Leaf, caterpillar, jar, twig, butterfly, flower, sugar-bowl, honey-pot, spoon, sugar-tongs.
BEAD THREADING.						Little caterpillars, butterflies, flowers, etc. (small beads threaded on fine wire and then twisted into the required shapes) for the sand gardens and parks.
GAMES.	The Butterflies. Nature's Easter Story.	The Butterfly's Lady-Love ("The Wild Bee's Lady-Love" adapted).	Spring Time Joy.	Awake! Awake! The Brown Butterfly.	The Caterpillar ("a creeping thing upon the ground"). Butterflies.	The Caterpillar. Butterflies.
STORIES.	A Lesson of Faith.	The Green Caterpillar.	Such a Beauty!	The Spring Butterfly.	The Caterpillar that went to Sleep. The Butterfly Baby.	The Cocoon. An Early Butterfly.
PICTURES.	Summer (F. Hines). Spring (F. Hines).	Summer (Seasons: Fitzroy). Spring (Seasons: Fitzroy).	Pictures of the Months (Fitzroy).	Happy Days (Fred Morgan). A Day in the Country (W. & A. K. Johnston).	The Garden Gate (Froebel). Happy Days of Spring (Fornan).	The Little Gardener (Froebel). Happy Days of Spring (Fornan).
RECITATIONS.	The Caterpillar's Wings.	The Caterpillar's Dream.	"Butterflies."	"Butterflies are Pretty Things."		
HYMNS.	Summer suns are glowing. When the earth wakes up in gladness.	As in I.	As in I.	As in I.	As in I.	As in I.

B. V.—LIST OF BOOKS REFERRED TO FOR
INFORMATION AND READING

European Butterflies and Moths, W. F. Kirby, F.L.S., F.E.S. ; *Text-book of Zoology treated from a Biological Standpoint* (Vol. III.), Dr Otto Schmeil, English translation by Rudolph Rosenstock, M.A. ; *Text-book of Zoology*, Nicholson ; *Science for All* (Vol. III.) ; *Origin and Metamorphoses of Insects*, Lord Avebury ; *The Outdoor World*, W. Furneaux, F.R.G.S. ; *Thierkunde* (Vols. I. and II.), Lüben ; *Die Schmetterlinge Europas*, Dr Arnold Spuler ; *Die Raupen der Schmetterlinge Europas*, Dr Arnold Spuler ; *Nature Study and Related Literature*, A. E. M'Govern ; *Paradise Lost* (Book VII.), Milton ; *To the Butterfly*, Rogers ; *To a Butterfly*, Wordsworth ; *Die Metamorphose der Thiere*, Goethe.

LIST OF BOOKS FROM WHICH THE GAMES, STORIES,
AND RECITATIONS HAVE BEEN SELECTED

Holiday Songs and Everyday Songs and Games, Emilie Poulsson ; *Finger Plays for Nursery and Kindergarten*, Emilie Poulsson ; *The Child's Song and Game Book* (Part III.), H. Keatley Moore, Mus. Bac., B.A. ; *Song Stories for the Kindergarten*, M. J. Hill ; *Songs for Little Children* (Vol. II.), E.

Smith ; *Stories in Song for Kindergarten, Home, and School*, Emerson and Brown ; *The Daisies and the Breezes, Sea Shell Songs*, L. Ormiston Chant ; *Child Garden* (Vols. III., V., VI.) ; *Parables from Nature*, M. Gatty ; *In Story Land*, E. Harrison ; *In the Child's World*, Emilie Poulsson ; *Little Folk's Land*, N. G. Groser ; *Primary Education* (Vol. XI.) ; *Arcadian Reciter* ; *Rhymes and Finger Plays*, selected or written by Lucy R. Latter, for the "Everyday Life Series of Pictures," published by W. & A. K. Johnston.

CHAPTER IX

“ Another round, and higher,
Ye shall climb on the heavenly stair.”

IN this article I reproduce the plan of work prepared for my own school in connection with the loftiest subject in the physical world—the sun—as the last example in this book, illustrative of the relation of the school garden to the rest of the school curriculum.

B. II.—THE STANDPOINT FROM WHICH THE SUBJECT WAS CONSIDERED WITH THE CHILDREN

“ Let there be lights in the firmament of the heaven to divide the day from the night ; and let them be for signs, and for seasons, and for days, and for years.”

“ O glorious orb ! O golden sun !
I would I had an angel's ken,
Your deepest secrets to divine,
And read your mysteries to men.”

The sun is chosen as a subject for special consideration during the months of April, May, and June in order that the children may be helped to realise how absolutely all living things depend upon the sun for their physical needs and welfare. The

earth is lit up by its beams, and warmed by its heat. But this is not all. The sun builds up the vegetable world, and so clothes the earth with verdure and beauty, and provides the means of sustenance for the creatures of the animal world, even man himself. All the work of the world is done by the sun, and "man himself, prince or peasant, is but a little engine which *directs* merely the energy supplied by the sun."

But is there not a higher thought? Has not everything in Nature a spiritual prototype? In leading the children humbly and reverently into the glorious realms of Nature we are helping them to realise something of the perfect order and beauty of the spiritual or world of cause, as well as of the physical or world of effects, and also the great love and wisdom of the Divine Planner, whose tender mercies are over all His works. Says Proctor, one of our astronomers :

"The sun is an emblem of the Almighty in being the source whence all that lives upon the earth derives support. Our very existence depends on the beneficent supply of light and heat poured out continually upon the earth by the great central orb of the planetary scheme. . . . Yet again, the sun is an emblem of the Almighty in the manner in

which He bestows benefits upon us and is forgotten. Day after day we enjoy the sun's light and heat ; clouds may conceal him from our view, much as troubles may cause us to forget God ; and the heat he pours out may seem sometimes insufficient or excessive, even as in our ignorance we are dissatisfied with the blessings bestowed by the Almighty.

“ Yet these very clouds are among the good works we owe to the sun—they bring the rain, which ‘ drops fatness upon the earth ’ ; and without the changes of the season there would be neither the time of harvest nor the time of vintage. The cold of winter and the heat of summer, at which we often repine as excessive, are as necessary for our wants as the cool breeze and the genial warmth of spring and autumn.

“ We commonly forget, also, that the sun, besides sustaining us by his light-giving and heat-supplying power, keeps us always near to him by that mighty force of attraction which his vast bulk enables him to exert.”

B. III.—PLAN OF WORK WITH THE CHILDREN

What a beautiful bright morning ! Everybody seems glad and cheerful, and every place full of happy light ! What can it be that is making us

all so glad? Yes; the sun is shedding its glory over the earth. Who has noticed the sun this morning? Where did it seem to be when the children came into school this morning? What did it look like? Although the sun is very, very far away from us, its brightness is so great that we cannot look at it longer than a second or two.

The children go out into the playground and observe the position of the sun in the sky at given times. They observe its shape and brightness through a piece of smoked glass. The first class children refer to their sun chart for the progress of the sun in the sky during the previous months. The record is continued.

SUNBEAMS

The sun's light comes streaming down as merry, busy little sunbeams. They have always a great deal of work to do on the earth. They not only make every place bright and cheerful, but also nice and warm. Without the light and heat of the sun it would be bitterly cold and dark. No plants and no animals could live.

The children recall some of the dark days of the preceding winter, when the sun shone but little; how some days the ground was covered with snow and ice, and then the sun sent its warm beams to melt them. Now the warm sunbeams have been

kissing the sleeping flowers and all the tree-buds, and bidding them wake up to help make the earth beautiful again. The insects too are being wakened up from their long winter sleep, and the birds called back to cheer us with their songs once more.

Let the children hold one hand in the sunlight. They find that it gets warmer than the hand which is not so held. Let them touch an object (a window-sill or the railing of the verandah) on which the sun is shining. Groups of children go to the garden, and also to Greenwich Park, to see what flowers have been kissed by the sunbeams. They find crocuses holding up their beautiful cups to catch the bright light of the sun, later golden daffodils rejoicing in the glorious sunlight, and hyacinths of almost every hue flinging their soft and delicate perfume from their dainty bells, and all around trees and bushes bursting into living green. Indoors the children find the sticky and other buds bursting open more and more each day, and most of their bulbous plants, not right in bloom, in full bud, ready to reveal the rich flowers within at Apollo's first radiant smile.

THE PATH OF THE SUNBEAM, AND WHAT MAY BE SEEN IN IT

The sun always sends its beams down to the earth by a short way. They come straight down, but they cannot go through a stone wall or a

wooden door. Can the children name some of the things the little sunbeams can get through? As the little sunbeams come journeying down to us something else seems to come with them. Little specks of dust, which are moving about all the while, although we cannot always see them, even when the sun is shining brightly. Why?

Again, the dust specks help to make the pretty colours which we see in the sky at certain times of the day—at sunrise—at sunset. * How?

The windows in the teachers' room are all darkened (with brown paper). A little hole is left in the material covering one of the windows. Groups of children go up to the room and observe the effect.¹

** The children are enlisted to watch the sky and note the pretty colours they see there at sunset.*

CATCHING A SUNBEAM

What a sunbeam does when it meets a polished surface.

It forms a bright or light picture somewhere of itself.

Sun pictures, and how they are formed.

Individual children try to catch sunbeams

¹ When this work was taken, the children were much amused by the appearance on the ceiling of the room of the shadows of children playing in the playground.

coming into the room with a small piece of looking-glass. Other children find the light picture formed thereby. A bowl of clear water is placed in the way of a sunbeam and the effect watched.

Poulsson's "Song of the Light Bird" may here be sung.

The children lay a leaf on a piece of sensitised paper under glass, and then expose it to the light. The parts of the paper not covered by the leaf change colour, so that when the glass and leaf are finally lifted the form of the latter remains.

** Individual children make a small hand camera with a suitably shaped box, such as an ordinary cigar-box. With such a pinhole camera the older children can take photographs.*

THE COLOURS IN THE SUNBEAM

What do they tell grown-up people? How do we find out the colours of the sunbeam?

THE PRISM

What is it, and what does it do to the little sunbeam trying to pass through it?

THE RAINBOW

What is it? Its beautiful form, its lovely colours. How and when is it formed? When is it only to be seen? Does it ever appear in the same part of the sky as the sun? What always accompanies the rainbow?

*As on previous occasions, the windows in the teachers' room are darkened, and a little hole is left in the material covering one of the windows. Groups of children go up to the room to watch the effect of a sunbeam or ray of light passing through a prism on to a screen of white paper, on to the floor, a black-board, the children themselves. They notice the colours thrown on the screen, the floor, the blackboard, and themselves. * The work of the dust specks is recalled. The younger children blow soap-bubbles in the sunlight, and notice the pretty colours in them.*

THE SUN AS A GIVER OF HEALTH

Most plants soon become sick and die if they are shut away from the light of the sun. Most animals, too, need light. We are all happier and stronger when we shut ourselves as little as possible from the light of Heaven. The little children in dark, gloomy streets are never so happy and strong as children living in bright, sunshiny places. Many of the little birds fly away to a warmer, brighter country directly winter comes.

The children recall the appearance of the indoor bulbous plants when first taken out of the dark just after Christmas.

They also recall the putting of the school doves in a sunny window, or right out of doors on a warm bright day.

The children look at the plants in school (the daffodils, narcissi, tulips, etc.). They notice

that they all turn their heads towards the window. They notice also that most of the plants farthest from the windows seem less strong and happy.



“ Little flower . . . if I could understand
What you are, root and all, and all in all,
I should know what God and man is.”

*They call to mind how the sunflowers in the garden
always kept their faces turned towards the glorious
sun.*

THE SUN AS A PAINTER

The sun helps to make the leaves of plants green ; it also helps to make the colour of the flowers and fruits.

The children recall the blanched appearance of the upward shoots of their indoor bulbous plants when first taken out of the dark, and how they gradually became green when kept in the light. They recall the gradual exquisite "painting" of the hyacinth flowers. The children go in groups to the garden, and notice the bright appearance of the plants when the sun is shining. They also notice the beautiful colours in the sky. Groups of children go to Greenwich Park and notice the effect of the sunlight on the trees, on the grass, etc.

Sometimes the sun takes the colour away from things. A picture is lifted down from the wall. The children notice the difference between the colour of the space previously occupied by the picture and the rest of the wall. They find the flowers on some of their hats have lost their pretty colour.

THE SUN'S DRYING AND BURNING POWERS

Sometimes the sun dries and parches the ground, and even burns the grass and other things. The children's faces are often browned and burnt by the sun in the summer-time.

* The use of the burning-glass.

Individual children test the burning power of the sun with pieces of paper and a magnifying or burning glass for the time being.¹

A saucer of water is left out in the sunlight. The children find in a day or so that the water has

¹ A day or so after this work was taken with the children, a little boy brought to school a rough piece of wood on which his father had burnt his name with a burning-glass.

all disappeared. A pot of earth is likewise left out in the sun. The children soon find that the sun has dried the earth all up.

(NOTE.—The water in the saucer will in any case disappear, and the earth in the pot dry up in course of time, but they do so more quickly under the direct influence of sunlight. The children might be encouraged to notice which side of the playground (the sunny or the shady one) dries the quicker after a storm. They might also be encouraged to look at the plants in the south and in the north windows of the school, and see in which case the earth seems to get dry more quickly.)

* STORED-UP SUNBEAMS

The burning of the Christmas-tree logs in school recalled, the pretty light then given out by them. Our beautiful fir-tree was giving us back some of the little sunbeams which it had stored up during its life in the forest. In a similar manner, long ago, the trees and ferns in big woods stored up all the sunbeams they could catch, and when they had finished their work as trees and ferns they fell, or were blown down. Then they gradually got covered up and pressed closer and closer deep in the earth. Now when men dig down through the rocks they come upon these remains of the trees and ferns in the form of what we call coal.

Pieces of coal with impresses of ferns upon them are examined by the children.

* THE SUN AS A GUIDE TO THE TRAVELLER

Long ago people had to find out their way in the daytime by noticing the position of the sun in the sky. They noticed that the sun always rose in a particular place, and that it always set in a place opposite to where it seemed to rise. They watched the sun still more, and noticed that it seemed to go up to a certain place in the sky, and then gradually go down towards the place where it had always seemed to set. This helped the people to find their way generally. By-and-by they fixed upon the highest point in the sky which the sun seemed to reach, and determined from there other directions, and then they were able to find their way about still better in the daytime.

The compass. The weather-vane.

Groups of children go out at twelve o'clock. They find out from the position of the sun in the sky the direction in which they are walking.

Individual children make a small compass, a small weather-vane, and use the same in the school and in the playground.

SHADOWS

“The light may lie in splendour on the wall,
And yet without man’s skill that light is all.
The light alone no picture can produce.

Who would God’s comfort find must work with God.
Even life’s shadows beautiful may grow,
If with Heaven’s light we work them so.”

What shadows are. How they are caused. How they vary in length and position. These variations determined by the position of the source of the light.

A child places a flower-pot, or some other simple object which is not transparent, in the path of a sunbeam. The class notice that a "dark picture," or shadow, of the flower-pot is formed. They tell on which side of the flower-pot the shadow is formed, and whether close to it, or far away from it. They notice on which side of the flower-pot the sunlight falls, and that it cannot get through it. A smaller flower-pot is placed immediately behind the bigger one. The children notice whether the sunbeam finds it, and whether any shadow of it is formed. They notice where the sunbeam is passing by the bigger flower-pot, whether it passes over it, and where it strikes the ground. The children experiment with various other objects, and then decide that shadows are like brush pictures of any objects standing in the path of a ray of light.

*The children look for other shadows in the hall and in their classrooms, and notice in each case what is standing in the way of the light and thus causing the shadow. * An individual child is allowed to move a lighted candle above a ball. The class watch, and observe that as the light is gradually moved higher and higher (in the line of an arch) the shadow of the ball gets smaller and smaller, until it almost disappears when the light is above the ball ; and that when the light is moved down on the other side of the ball the shadow gets longer and longer. * Another child is allowed to*

*move the light round the ball in such a way that it is parallel to it all the time. The class note what happens in this case. * The experience gained by these little experiments is then applied to the position of the sun with regard to objects.*

A straight stick is put up in the playground. The children observe, and mark with coloured chalks, the shadows made on the ground by it at different hours. The shadows cast by the railings are similarly observed and marked at different hours. The children watch their own shadows—their long morning and evening shadows, and their short noon ones. The shadows of moving objects in the playground thrown on the ceiling of the darkened room on previous occasions recalled. The children are encouraged to observe any shadows of objects they pass on their way to school and on their way home.

IDEAS OF TIME

The sun sends its beautiful light beams to us in the morning. They come quite softly into our rooms. They touch our eyes very gently, then we wake up, and know the day has come, and the time for work and play—for birds and bees and flowers as well as for the children and grown-up people. But by-and-by we do not see the sun, and the streets and roads are all dark. Night has come—the time for rest. Even many of the little plants get sleepy when it is dark. The next

morning the sun rises as before, and after shining all the morning and afternoon it goes down again as night comes on. When does the sun "get up"? When does it go down? The beauty of the sunrise; of the sunset.

The children are encouraged to observe the flowers in the school garden (eschscholtzia, flax, convolvulus, etc.) at different times in the day. They find out what flowers are awake in the garden when they come to school in the morning; what flowers are then still asleep; when they wake up, and whether any of them go to sleep before the end of the afternoon.

** The children experiment with a lighted candle and orange, if possible, in a darkened room, and find out that the side of orange towards the light is illumined whilst the side which is turned away from the light is in darkness.*

** This experience is then applied to the question of day and night.*

THE SUNDIAL

Long ago people had no clocks, as we have, to tell the hours. What do the children think they did then? They used to tell the time by watching the sun and the shadows. Then they made a kind of clock face, with figures on it; but instead of putting hands on it, such as we have on our clocks, they fixed a stick or rod on it, in such a position that it threw a shadow which grew longer, shorter,

and then longer again, in the sunshine as the day advanced and declined. They noticed what happened to the shadow thrown by the stick when the sun was at its highest point in the sky, and determined the hours accordingly. Sometimes these sun clocks, or sundials as they were called, were placed upright on the south wall of some big building. Sometimes they were placed in a horizontal position on a lower pillar out of doors.

Unfortunately, the sundial was of no use at night, nor on stormy or cloudy days, when the sun was hidden ; so the people had to think of another way of telling the hours. They tried to mark the time by means of sand, and even water, in curiously shaped glasses ; but this did not answer much better, so the people had to try again, and, after a long time, they succeeded in making clocks and watches such as we now have.

** The children take a walk to St Luke's Church, Charlton. Their attention is drawn to the sundial on the front of the south wall of the church.*

** A small sundial is made indoors by individual children for use in the playground. Other children make a sun clock on the window-sill of a room facing south, by the shadow of the casement. They chalk a line on the sill for every hour as the shadow advances until*

"The day is done ; and slowly from the scene
The stooping sun up-gathers his spent shafts,
And puts them back into his golden quiver."

WORK IN THE GARDEN

Completion of spring sowings.

Tying up straggling bulbous plants, and taking
up of spent ones.

Stringing of runner beans and variegated hop.

Staking of broad beans, and sweet and other
peas.

Putting up of scarecrows.

Cleansing of plants and ground from trouble-
some animal visitors, such as slugs, blackfly (*aphis*),
and ants.

Nailing up of trailing ivy and jasmine sprays.

Tying up of lilac bushes.

Thinning out and transplanting of lettuces,
carrots, cabbages, radishes, and onions.

Pulling of radishes and lettuces ready for eating.

Staking of tall sunflowers.

Watering, weeding and tidying of beds and
paths as usual.

Gathering of flowers and vegetables for gifts to
friends, for distribution among the children, and
for beautifying the school.

B. IV.—THE GIFTS, OCCUPATIONS, GAMES, STORIES, PICTURES, RECITATIONS, AND HYMNS
USED IN CONNECTION
Work, etc., for Three Months

	CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
	Windows through which the sun shines in the hall, in class-room A, and in the teachers' room.† Flowers and tree buds which have opened out in the sunlight in school, in the garden, and in Greenwich Park (crocuses, daffodils, hyacinths, and buds of the horsechestnut, oak, maple, beech, birch, etc.). Window in the teachers' room with a sunbeam streaming through it and (a) meeting a bowl of clear water and forming a light "picture" of itself elsewhere in the room; (b) passing through a prism and showing its pretty colours on the floor. Rainbow and sun, their relative position. Miniature trees growing in school (horsechestnut, oak, maple, etc.). A tree in the park touched by the sunlight. Picture of the sky as observed from the playground at a	Windows through which the sun shines in the hall, in class-room A, and in the teachers' room.† Flowers and tree buds which have opened out in the sunlight in school, in the garden, and in Greenwich Park (crocuses, daffodils, hyacinths, and buds of the horsechestnut, oak, maple, beech, birch, etc.). Window in the teachers' room with a sunbeam streaming through it and (a) meeting a bowl of clear water and forming a light picture of itself elsewhere in the room; (b) passing through a prism and showing its pretty colours on the floor. Rainbow and sun, their relative position. Picture of the sky as observed from the playground at a given time; of any butterflies seen in the garden or which have waked up in school. Shadows of various objects in the playground (flower-pot, vase, stick, verandah railing, garden fence	Window through which the sun shines in the hall, in class-room A, and in the teachers' room.† Flowers and tree buds which have opened out in the sunlight in school, in the garden, and in Greenwich Park (crocuses, daffodils, hyacinths, and buds of the horsechestnut, beech, birch, elm, etc.). Window in the teachers' room with a sunbeam streaming through it and (a) meeting a bowl of clear water and forming a light picture of itself elsewhere in the room; (b) passing through a prism and showing its pretty colours on the floor. Rainbow and sun, their relative position. Picture of any butterflies seen in the garden, or which have waked up in school. Shadows of various objects in the playground and in the school (flower-pot, vase, stick, verandah railing, garden fence	The sun. The window through which the sun shines in the teachers' room.† Crocuses, daffodils, buds of horsechestnut, beech, etc., which have opened out in the sunlight in the school and in the garden. A window-pane in the teachers' room with a sunbeam streaming through it. A bowl, prism, soap bubbles and pipe, rainbow, sunshade.	The sun. The window through which the sun shines in the teachers' room.† Crocuses, daffodils, buds of horsechestnut, beech, etc., which have opened out in the sunlight in the school and in the garden. A window-pane in the teachers' room with a sunbeam streaming through it. A bowl, prism, soap bubbles and pipe, rainbow, sunshade.	The window through which the sun shines in the teachers' room.† Crocuses, daffodils, buds of horsechestnut, etc., which have opened out in the sunlight in the school and in the garden. A window-pane in the teachers' room with a sunbeam streaming through it. A bowl, hand-mirror, soap bubbles and pipe, rainbow, sunshade.

DRAWING
(Free and other).

Do.	grassy slope in the park; of any butterflies which have waked up in school or been seen in the garden. A magnifying-glass. Shadows of various objects seen in school and in the playground (flower-pot, vase, stick, verandah railings, garden fence, individual children). Sundials (the face of the one used in the playground, of the one on the front of St. Luke's Church, Charlton). Hour-glass. Flowers in the garden at different times in the day (flax, eschscholtzia, etc.). The weather-vane on the top of the senior schools.	playground (flower-pot, vase, stick, verandah railings, garden fence). Sundial (the face of the one used in the playground).	<p>The face of the sundial used in the playground.</p> <p><i>Note.</i></p> <p>† The windows in five of the six classrooms face the North or the East, hence the frequent reference to the windows in the hall, the teachers' room, and classroom A, which more or less face the South.</p>		
	Crocuses, daffodils, hyacinths, and buds of horsechestnut, beech, oak, etc. Rainbow and sun. Picture of the sky as seen from the playground at a given time. A ball and its shadow. Flax, eschscholtzia, etc., asleep and awake.	Crocuses, daffodils, hyacinths, buds of horsechestnut, beech, oak, etc. Rainbow and sun. Picture of the sky as seen from the playground at a given time. A ball and its shadow.			
BRUSHWORK AND COLOURING.	Crocuses, daffodils, hyacinths, buds of horsechestnut and beech. Bowl, prism, sundial, weather-vane.	Crocuses, daffodils, hyacinths, buds of horsechestnut and beech. Bowl, vase, sundial.	Crocuses, daffodils, tulips, buds of horsechestnut and beech. Rainbow, and its shadow.	Crocuses, daffodils, tulips, buds of horsechestnut and beech. Rainbow, sunshade.	
MODELLING.					

CLASS I.	CLASS II.	CLASS III.	CLASS IV.	CLASS V.	CLASS VI.
<p>Mirror, tent, sunshade, pipe, balls of the colours seen through the prism, pickaxe, shovel (square and oblong-shaped paper).</p> <p>PAPERFOLDING.</p>	<p>Window, tent, flower, mirror, sunshade, fan (square-shaped paper).</p> <p>Windows, school playground, plan of school garden (collective work), stairs leading to the teachers' room. Prism, fireplace, shaft of a mine, Summer-house. Front of a church with little paper dial added. School or church tower with toy weather-vane added.</p>	<p>Window, duster for cleaning window that the sun may shine better through it. Sunshade, fan, mirror, tent (square-shaped paper).</p> <p>Windows, school playground, stairs leading to the teachers' room. Fireplace. Summer-house. Front of a church added. Clock. School or church tower with toy weather-vane added.</p>	<p>Windows, walls, stairs, and door leading to the teachers' room. Playground, clock tower, park gates.</p> <p>† Objects made with Gift. III. reproduced on the flat.</p> <p>Sun, window, bowl, sunshade, church, summer-house, garden-hat, fan, butterfly.</p>	<p>The school. Windows, walls, playground, clock tower, park gates.</p> <p>Window, tree, sunshade, summer-house, garden-hat, hand-mirror.</p> <p>Window, sunshade, church tower, mirror, fan, summer-house.</p>	<p>Window, tree, sunshade, summer-house, garden-hat, hand-mirror.</p> <p>Sunshade (closed). A rainbow colour box. Balls of all the colours of the rainbow.</p> <p>Exercises with the ball (as the pendulum of a clock). Exercises with the balls of the various colours of the rainbow.</p>
<p>GIFT IV. (Classes II. & III.). GIFT III. (Classes IV. & V.).</p> <p>TABLETS † (Squares).</p>					
<p>RINGS AND STICKS (Class III.). STICKS OR LATHS (Classes IV., V., VI.).</p>					
<p>JOINTED LATHS (Class V.). FRAYING (Class VI.).</p>					
<p>GIFT II. (Classes V. & VI.). GIFT I † (Class VI.).</p>					

SANDWORK.					Garden with a pond in it, park, hill. Playground (collective work).	Garden with a pond in it, park, hill. Playground (collective work).
THREAD LAYING. BEAD THREADING†					Window, bowl, pipe, soap bubble, sunshade, hand-mirror, flower.	Window, bowl, hand-mirror, pipe, soap bubble, sunshade, flower. † Blind for the window.
GAMES.	Golden Sunshine. A Sunny Morning. The Thunderstorm. Closing Hours.	The Sunbeams. Out in the Meadows. Over the bare hills. The Sunbeam Sea.	The Light Bird (a quiet little sunbeam). Song for the Prism. Rainbow Song. The Shadow Rabbit.	Twilight and Dawn. Awakening Song. The Story of the Day. Sunbeams.	The Sunshine's Message. Good Morning, Merry Sunshine! The Sun. Sunshine Song. The Light Bird (O birdie, sweet birdie on the wall). A Sunset Song.	Morning Sunshine. The Window. The Rainbow Ball Game. The Colour Game. Stars and Daisies. The Weather-vane.
MARCHING SONGS.	When the morning sun so bright, Up in the morning's cheerful light.	As in I.	As in I.	As in I.	As in I.	As in I.
STORIES.	Demeter and Persephone. Aurora and Tithonus. A Story of a Lump of Charcoal.	The Light of Life. Phaeton. From Sunshine to Firelight.	Iris — the Rainbow Queen. What the Clock told Dolly. The Carbon Fairies.	Clytie. The Sunshine Party. The Line of Golden Light.	The Sunbeams. The Wind and the Sun. Old Father Sol.	Up in the Spring. The Little Plant. The Sunbeams.
PICTURES.	Aurora (Guido Reni).	Day and Night (Thorvaldsen).	Salisbury Cathedral (Constable).	Happy Days (Fred Morgan).	The Little Window (Froebel).	The Light Bird (Froebel).
RECITATIONS.	Starlight and Sunlight. The Children's Réveille. Summer Time.	The Sun's Travels. Golden Rod. What the Coal says.	Good Morning, Sun-shine! My Shadow. What the Sunbeams became.	To the Sunbeams. Day and Night. The Rainbow.		
HYMNS.	When the earth wakes up in gladness. The Morning Sun is Shining. Summer Suns are glowing (<i>adapted</i>)	As in I.	As in I.	As in I.	As in I.	As in I.

B. V.—LIST OF BOOKS REFERRED TO FOR
INFORMATION AND READING

Star Land ; Elements of Astronomy, Sir R. S. Ball ;
*The Expanse of Heaven ; The Sun ; Flowers of
the Sky*, Proctor ; *Elementary Lessons in Astronomy*,
Sir Norman Lockyer ; *A Text-book of General
Astronomy*, C. A. Young (Professor of Astronomy,
Princeton, U.S.A.) ; *On Light ; The Forms of
Water*, Tyndall ; *The Fairy Land of Science*,
Arabella B. Buckley ; *Man's Place in the Uni-
verse ; The Wonderful Century*, Alfred R. Wallace ;
The Book of Sundials, Mrs Alfred Gatty ; *Com-
mentaries on the Light Bird, the Shadow Rabbit,
etc.*, Froebel (S. E. Blow's edition) ; *The Beauties
of Nature*, Sir John Lubbock ; *The Queen of the
Air*, Ruskin ; *The Old Benchers of the Inner Temple*,
Charles Lamb (Essays of Elia) ; *Hymn to Apollo*,
Shelley ; *Address to Light*, Milton ; *Morning*,
Milton ; *Hymn before Sunrise in the Vale of
Chamouni*, Coleridge ; *The Rainbow*, Campbell ;
Tithonus ; Demeter and Persephone, Tennyson ;
A Day of Sunshine, Longfellow.

LIST OF BOOKS FROM WHICH THE GAMES, STORIES,
RECITATIONS AND HYMNS HAVE BEEN SELECTED

Holiday Songs and Everyday Songs and Games, E. Poulsson ; *Songs and Games for Little Ones*, Walker and Jenks ; *Songs for Little Children* (Vols. I. II.), E. Smith ; *Song Stories for the Kindergarten*, M. J. Hill ; *Stories in Song for Kindergarten, Home, and School*, Emerson and Brown ; *Little Games for Little People*, D. Pearce ; *The Children's Song and Game Book*, H. Keatley Moore ; *Kindergarten Chimes*, K. D. Wiggin ; *Songs, Games, and Rhymes for the Nursery, Kindergarten, and Primary School*, E. L. Hailmann ; *Songs and Music of Froebel's Mother Play* (S. E. Blow's edition) ; *Sea Shell Songs* ; *Daisies and Breezes*, L. Ormiston Chant ; *Nature Songs*, F. Hoare and C. H. Lewis ; *Music for the Kindergarten* (Supplement I.) E. Heerwart ; *Kindergarten Gift Plays*, M. E. Nuth ; *Related Literature*, A. E. M'Govern ; *Favourite Greek Myths*, L. S. Hyde ; *Nature Myths and Stories*, F. J. Cooke ; *Legends of Greece and Rome*, G. H. Kupfer ; *In the Child's World*, E. Poulsson ; *Parables from Nature*, M. Gatty ; *In Story Land*, E. Harrison ; *Philadelphia, Kindergarten Stories*, L. van Kirk

and M. G. Clark ; *Child Garden* (Vols. III., VI., VII., VIII., IX., X.) ; *A Child's Garden of Verses*, R. L. Stevenson ; *A String of Pearls* (Verses for Children), Lady Lindsay.



“What if earth be but the shadow of Heaven ? ”

CHAPTER X

“ The end crowns all.”

I HAVE shown the place which gardening should hold in a good system of infant education, and also what a vast store it offers for us to draw upon in the rest of our work with the children. It now remains to me to show more particularly the effect of gardening upon the child, the school, and society at large, and whether that effect be of such value as to demand the special attention of the Educational Authorities with a view to the providing of suitable gardens for every school, as well as opportunities for the cultivation of the same by the children as part of their school work.

In dealing with the effect of gardening upon the children, we must keep in view their threefold nature, and remember that, although the physical, the intellectual, and the moral sides exist throughout, one side is more predominant than the others at a given time in the development of the human being. In the earliest years the physical nature is more to the fore. Gardening is an outdoor

occupation. The child is, therefore, continually in the fresh air, and one has only to watch him when engaged in the work to see how thoroughly he enjoys it. His whole heart and soul are involuntarily thrown into it, and no task seems too much for him, so does "the labour we delight in physic pain."

The child's labour in the garden involves a variety of movements, and affords a natural outlet for much of that physical energy which, if left unprovided for, leads to rough play and unruly practices, and, later, even to hooliganism itself. Again, the child is unconsciously impressed by the sight of the pretty flowers, the graceful insects, and other wonderful little creatures which share the life of the garden; by the fragrance of the flowers and the fresh smell of the ground after a storm of rain, and by the beauty of the heavens. He listens to the songs of the birds; to the sound of the wind, now soft, now shrill or loud. He tastes the fruit of some of his labours. And so, by means of his eyes, his nose, his ears, his mouth, and his hands, his senses are all thus trained, in a natural way, without any effort, and a host of delightful experiences are gathered the while, as a basis for further development. It is mind acting through ultimates and creating the next step

above. The same process goes on all through life. Development may, therefore, be defined as "the action of the highest in and through the lowest for the production, in successive order, of all degrees above that lowest or ultimate."

Loving contact with, and care for, some of the wonderful things of Nature around him awakens in a child a strong feeling for the wonderful and the beautiful. This feeling reacts upon the child, and refines him. No child who has ever tended and watched the tiny seeds, which he has put into the earth, develop and put forth leaves, flowers, fruit and seed will ever afterwards ruthlessly tear any flowers to pieces. Similarly, no child who has ever followed the wonderful life-history of some of the lowly creatures which he meets with in the garden will ever trample purposely upon a worm or a snail, still less will he have any pleasure in catching butterflies, and sticking them on pieces of cork, merely to make a collection. He will rather respect and protect the lives of such marvellous creatures. From a love and care for the things of Nature the child rises to a deeper love and respect for his comrades and others, and through that again to a recognition of the all-wise, loving Father, the Giver of all good things. From the Visible to the Invisible is the only way. Re-

spect for plants and animals awakens respect for their environments, and this ultimately leads to respect for the neighbour's property.

The sights and sounds which afford the child gardener so much physical enjoyment, and appeal so tenderly to his heart, awaken a desire to know something more about the inhabitants of his garden, and also of the phenomena which affect it. The intellectual side of the child's nature now claims its due, and for the cultivation of the power of observation there is no better field than the school garden, where the minutest fact observed leads to the desire on the part of the observer to know the "why," "wherefore," and "how" of things. He will already have tried to express what he has observed with pencil or chalk and paper, or some other materials. Now the time comes when the child will be ready and eager to master the art of reading in order to learn more and more of Nature's secrets.

Let the number lessons be based upon the number and size of the beds and paths in the garden ; upon the height of the various plants ; the number of buds, full-blown flowers on a stem ; the quantity of seed yielded by various plants ; the amount of time required to dig up the potatoes in one bed, in two or more beds of equal size, etc.,

and arithmetic will appeal with ever-new interest to child and teacher alike.

Each hour spent in work in the garden means the opening of a fresh door for the child in the realms of science. Neither will this close the doors of Art and Literature to him. Nature is still the great artist and the great poet. We have made a dreary workshop of life; let us now make a beautiful palace of it once more.

But the child is only a unit of the school, and the school is but a part of the community. If each individual of the former is being more or less developed in the way I have tried to show, by gardening and communion with the things of Nature, the school as a whole, and the community as a whole, must also each be the better and the richer for such training of its members. I do not say that gardening is a panacea for all the ills of the world, although, doubtless, it is for the most of them, but there can be no question that the community which fosters gardening, in its highest and best sense, will enjoy a richer, fuller, and less selfish life; for the culture of the intellect will not then be pursued at the expense, or to the exclusion, of the culture of the heart.

It behoves the Educational Authorities, then, to insist that a garden shall be attached to every

school, and that proper opportunities shall be afforded for the cultivation of the same by the children during school hours, and, therefore, as part of their school work, nay, as the centre for all the rest of the secular work of the school. We have human beings to train, not machines to guide; behind these human beings there is a boundless "flux of power eternally the same. It rolls in music through the ages, and all terrestrial energy—the manifestations of life, as well as the display of phenomena—are but modifications of its rhythm," proclaiming ever

"The Hand that made us is divine."

A P P E N D I X

NOTES FROM THE WRITER'S REPORT TO THE LONDON COUNTY COUNCIL ON A RECENT VISIT TO FRANCE FOR EDU- CATIONAL PURPOSES

IT may seem somewhat presumptuous to write anything about gardening in France after the valuable information and reports furnished by Mr Cloudesley Brereton, Mr John C. Medd, Professor Geddes, and others. I have, however, considered the matter from a different standpoint, and the information I was able to gather during a recent visit to that country may, therefore, be interesting to those anxious to promote gardening for little children.

I went to France chiefly for the purpose of learning what was being done—firstly, in the way of Nature-teaching in Infants' Schools; and secondly, in the way of school gardening as a means of developing the children physically and morally as well as intellectually. Gardening as a preparatory training in agriculture and kindred subjects did not, accordingly, enter into my plans; neither did gardens prepared and maintained for the children for botanical and other purposes—although I saw some of these, and was much struck

by the zeal displayed in the laying out of the gardens, though that sometimes resulted in the plants being scarcely visible for the labels describing them.

My time was extremely limited, and I had consequently to concentrate my attention upon a relatively very small area—namely, upon Paris and the district of Lens. I went provided with official credentials, and letters of introduction from many friends, and was, therefore, able to visit State as well as Voluntary schools and institutions.

I found that nothing had been attempted in the way of Nature-teaching—that is to say, the daily care and observation of plants and animals or school gardening in the State Infants' Schools which I visited in Paris. Neither could I obtain any evidence of such work being done, as yet, in any other of the State Infants' Schools. This is, doubtless, largely due to the fact that the principles of Pestalozzi and Froebel on infant education have been slow in taking root in a soil hitherto so little congenial to them. The result, however, of the absence of this kind of work in the schools is, to my mind, the most powerful argument in favour of Nature-teaching and school gardening for little children. It is the presence and care of the living and growing thing which gives vitality to a school. A child has such a totally different kind of pleasure in making a picture, for instance, of a plant which he has taken care of and watched from day to day than in making one of a plant of which he has only heard, or seen from afar. A

tender feeling is unconsciously expressed in the former case, whilst in the latter the production is more or less cold and formal.

I found, however, that *voluntary* efforts are being made in various places to bring the children in loving contact with some of the wonderful things of Nature.

It was my good fortune to meet Mademoiselle Gahéry, the founder of the "Société de l'Union Familiale." This lady is engaged, in one of the worst parts of Paris, in a remarkable scheme of educational work, somewhat akin to the one which has been gradually evolved in the famous Pestalozzi-Froebel House in Berlin. With the help of the "Société des Jardins Ouvriers de Paris et Banlieue," to which I shall refer more in detail later on, Mademoiselle Gahéry has secured a large piece of waste ground in the Rue de la Folie Regnault, near the Rue de Charonne and the but too well-known Roquette Prison. The size of this piece of ground, which was long the haunt of Parisian "apaches" or hooligans, is 6000 square metres. Part of this ground (about 1300 metres) has been levelled and covered with tan, for use as a playground by the children of the Charonne Institution. The remainder of the ground has been portioned off for gardens of two kinds—large gardens for the fathers of the children of the neighbourhood, and smaller gardens, from five to thirty metres in area, for children of kindergarten age and upwards. The scheme was inaugurated last October, a little fête having been specially arranged for the occasion.

The ideas of Pestalozzi and Froebel on gardening as an educative means are thus taking their first root in Paris in one of the roughest slums of the city.

Within easy access of Paris, at Bourg la Reine, near Sceaux, some interesting gardening is being done at the fine Lycée, a college erected on the site of an old palace, and dedicated to the well-known savant, Lakanal. There in the beautiful old park, which long ago witnessed the splendours of the Court of the Duchesse du Maine, and in which deer still have a place, is a piece of ground set apart for gardening purposes for pupils from seven years of age. The work is not part of the school curriculum ; it is simply taken as a kind of recreation for the boys who have an inclination for gardening. There are upwards of eighty beds. Each bed is about nine feet long and three feet broad, and is cultivated either by one boy or by a group of boys. Every boy has tools of his own, which he carefully keeps in a shed arranged for the purpose near at hand. The gardener of the college shows the boys how to set to work. Here in their little gardens, as M. Joxe (the Professor of Natural Science at the Lycée) observes, the children sow, it may be, the seed of the radish. They see it germinating. They assist in the development of the roots, the leaves, the branches, and flowers. They follow the formation of the fruit, the ripening of the new seed, and thus get an object-lesson which they will never forget, for it lasts not merely an hour, but many weeks.

The little gardeners gradually realise the re-

lationship between the life of the plants and the various forces of Nature ; they also see how certain actions of man may affect the life of the plants ; and if in the manual training classes the older pupils learn to shape inert material at their will, the younger pupils learn in their little gardens to shape the destiny of living things.

“Les Jardins des Ouvriers” were of special interest, and the object for which they exist affords another very strong argument in favour of school gardening as an important educative means. On the surface the plan is somewhat similar to our Allotments System. The “Société des Jardins Ouvriers” gives to a workman with a family of five or more children a piece of ground of about 120 metres in area, close to, or very near, the factory where he works. There he goes with his family after his work, as well as on Sundays and other fête days, to enjoy pure air, and a healthy change of occupation in cultivating the ground, and making it yield sufficient vegetable produce for the needs of his family and himself all the year round. At the same time he is thereby helped to escape the terrible temptations which are so often the outcome of loafing about. The ground belongs to the workman just as long as he keeps it in good condition and abstains from evil habits and bad company. This work keeps the man from the public-house and a great deal in the open air, and is, therefore, a preventive against drunkenness and many other diseases. About 100 of these working-men’s gardens have been formed

in and around Paris within the last two years through the agency of the "Société des Jardins Ouvriers de Paris et Banlieue." Through the kindness of the founder of this Société, M. l'Abbé Lemire, Député du Nord, a man also keenly interested in school gardening, I was able to see some of these working-men's gardens. I saw ten in the Boulevard Brune, near the Quartier Mont-rouge, and upwards of eighty others at Sceaux, just outside the city. At the bottom of each garden, close to a little strip reserved for the children of the fortunate workman, there is generally a nice little arbour, with a table and seat inside. Here the whole family gather for meals on Sundays and summer evenings. Here, too, the wife may often be seen doing her needlework, or some other sedentary household work, whilst her husband and children are busy gardening near by. In this way the family life of the working man is regenerated and consolidated.

From Paris I went, by the advice of M. Lemire, to Lens, one of the chief mining districts of the north of France. The Directors of the Mines there are strong advocates of gardening, as a means not only of developing the child, but also of reforming and elevating the adult. Each miner is provided with a nice little cottage of, I believe, from four to five rooms, surrounded by a good-sized plot of ground, from about 1000 to 1200 square metres in area, for gardening purposes. There are more than 5000 of such gardens at Lens. The four schools belonging

to the Company are similarly provided with ground for cultivation by the pupils. The soil was very poor and unsuitable for the purpose, but so convinced were the Directors of the value of the work that they went to the expense and trouble of having good earth brought to the district. Through the kindness of M. Reumaux, *l'agent général* of this mining company, I was able to visit one of their four schools—namely, the one at St Pierre, close to Pit No. XI. I had an extremely interesting and most instructive time in both the Senior Departments, each of which possesses a garden. The Head of the Boys' Department takes gardening with two of his classes as part of the school work, and, therefore, during school hours. He began it with fear and trepidation, but now he is so fully convinced of the great gain that such work is to the boys, intellectually as well as morally and physically, that he is only waiting to get more ground to let the rest of the classes have a plot each year.

The garden attached to the Girls' Department is of peculiar interest, and one from which we might well take a lesson. The pupils of the Domestic Economy Class have charge of the garden. They sow, plant, and cultivate every vegetable and flower they are likely to require for their work and lessons. This kind of gardening enables the girls to get an intimate knowledge of the life and habits, not only of many of the plants which help to make their surroundings beautiful and give pleasure to others, but also of many of

the plants which form their chief daily food. At the same time it awakens in the girls a newer and deeper interest in things which have hitherto only had a market value for them. Again, the girls who acquire such a practical knowledge of gardening during their school life will readily see, in later life, if they possess only ever so small a garden, a means whereby a little saving to the family purse may be effected, and the household continually supplied with fresh, home-grown vegetables.

I venture to suggest that gardening of this kind is worthy of consideration for the girls attending our Cookery or Domestic Economy Classes.

From the foregoing brief notes it will be seen that there is a growing feeling in France, as in England and other countries, that gardening may be something more than a means of improving the earth and making it yield as much fruit as possible. Such work is necessary, of course, for the sustenance and development of life, but it may also be a powerful factor for good in the existence alike of the child and the adult, and this is the thought which is stirring the men and women interested in educational and social reforms both at home and abroad to-day.

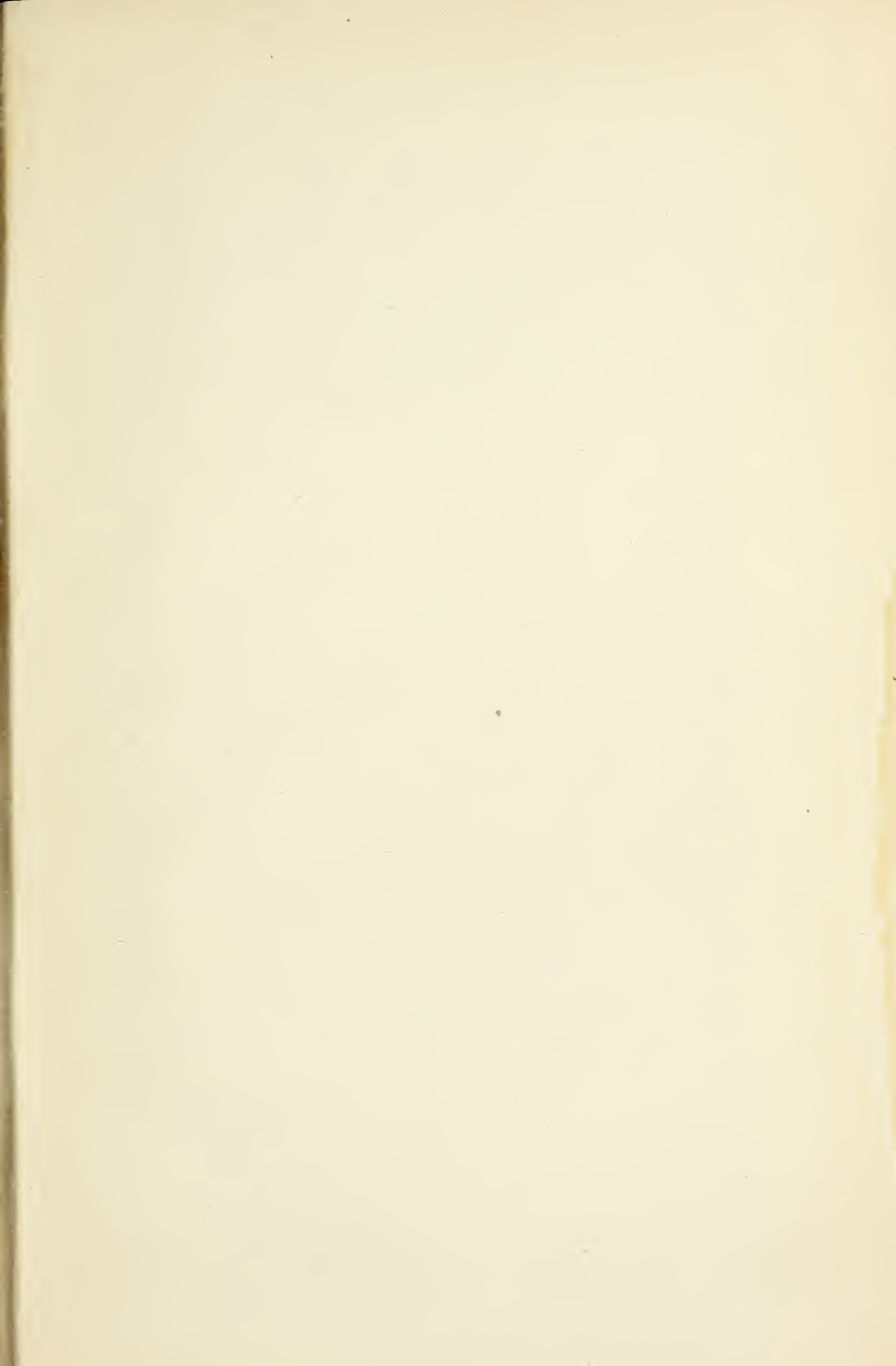
Life calls—and responds—to life; and with prophetic insight the pioneers of gardening in its highest and best sense see in this pure and healthy occupation the beginning of a newer and better order of things for all mankind—

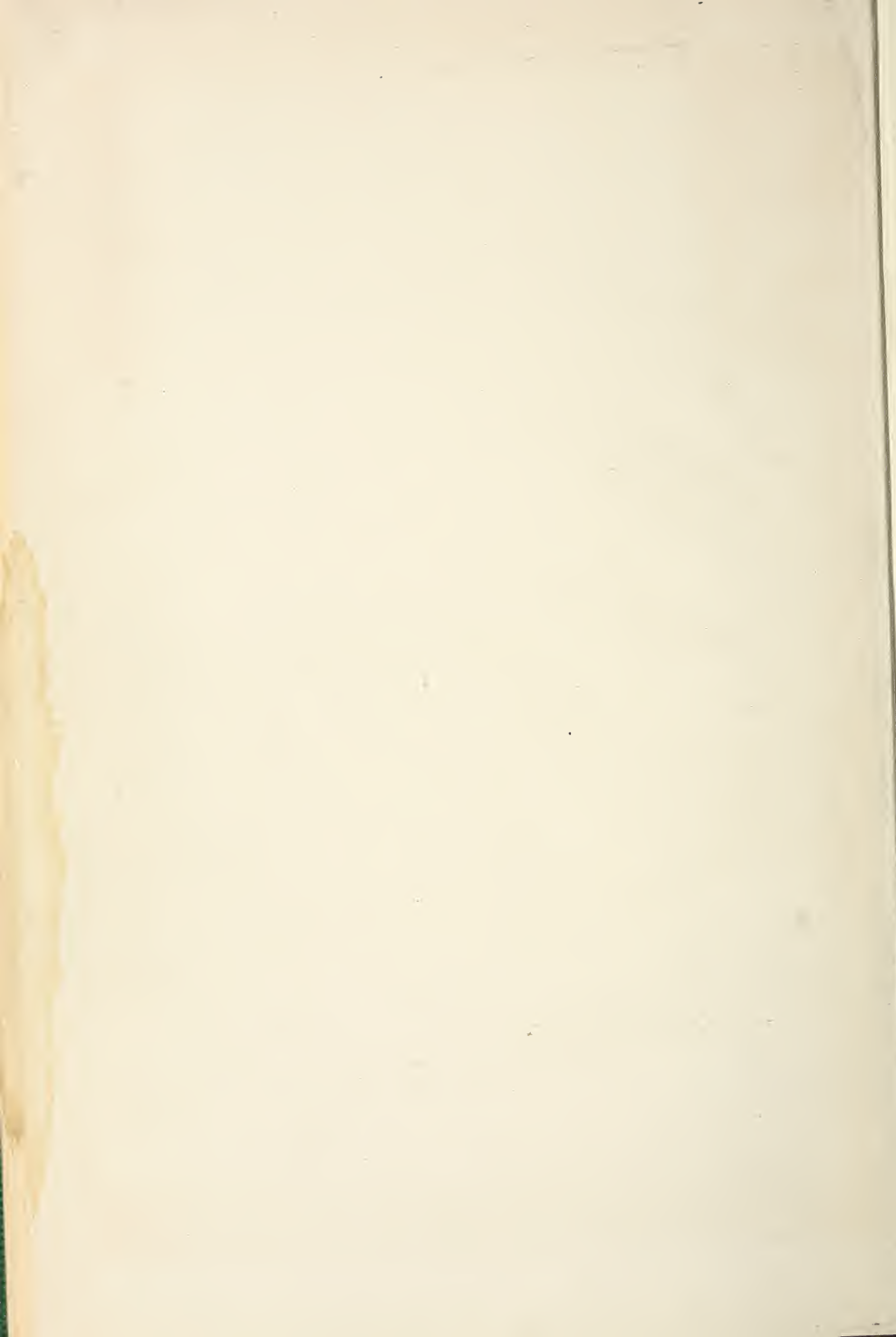
“The freedom and divinity of man,
The glorious claims of human brotherhood.”



"Sleep's gentle powers her drooping eyes invade."

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